

## CHAPTER TWO

### CHOOSING THE CORRECT PROCEDURE

SW-846 analytical methods are written as quantitative trace analytical methods to demonstrate that a waste does not contain analytes of concern that cause it to be managed as a hazardous waste. As such, these methods typically contain relatively stringent quality control (QC) criteria appropriate to trace analyses. However, if a particular application does not require data of this quality, less stringent QC criteria may be used. The purpose of this chapter is to aid the analyst in choosing the appropriate methods for sample analyses, based upon the sample matrix and the analytes to be determined. The ultimate responsibility for producing reliable analytical results lies with the entity subject to the regulation. Therefore, members of the regulated community are advised to refer to this chapter and to consult with knowledgeable laboratory personnel when choosing the most appropriate suite of analytical methods. In addition, analysts and data users are advised that, except where explicitly specified in a regulation, the use of SW-846 methods is not mandatory in response to Federal testing requirements.

Section 2.1 provides guidance regarding the analytical flexibility inherent to SW-846 methods and the precedence of various QC criteria. Section 2.2 reviews the information required to choose the correct combination of methods for an analytical procedure. Section 2.3 provides useful information on implementing the method selection guidance for organic analyses. Section 2.4 provides guidance on characteristic analyses and Section 2.5 provides guidance on the determination of analytes in ground water.

#### 2.1 GUIDANCE REGARDING FLEXIBILITY INHERENT TO SW-846 METHODS AND THE PRECEDENCE OF SW-846 QUALITY CONTROL CRITERIA

The specific products and instrument settings cited in SW-846 methods represent those products and settings used during method development or subsequently evaluated by the Agency for use in the method. Glassware, reagents, supplies, equipment and settings other than those listed in this manual may be employed, provided that method performance appropriate for the intended RCRA application has been documented. Such performance includes consideration of precision, accuracy (or bias), recovery, representativeness, comparability, and sensitivity (detection, quantitation, or reporting limits) relative to the data quality objectives for the intended use of the analytical results. In response to this inherent flexibility, if an alternative analytical procedure is employed, then EPA expects the laboratory to demonstrate and document that the procedure is capable of providing appropriate performance for its intended application. This demonstration must not be performed after the fact, but as part of the laboratory's initial demonstration of proficiency with the method. The documentation should be in writing, maintained in the laboratory, and available for inspection upon request by authorized representatives of the appropriate regulatory authorities. The documentation should include the performance data as well as a detailed description of the procedural steps as performed (i.e., a written standard operating procedure).

Given this allowance for flexibility, EPA wishes to emphasize that this manual also contains procedures for "method-defined parameters," where the analytical result is wholly dependant on the process used to make the measurement. Examples include the use of the toxicity characteristic leaching procedure (TCLP) to prepare a leachate, and the flash point, pH, paint filter liquids, and corrosivity tests. In these instances, changes to the specific methods may change the end result

and incorrectly identify a waste as nonhazardous. Therefore, when the measurement of such method-defined parameters is required by regulation, those methods are not subject to the flexibility afforded in other methods.

Analysts and data users are advised that even for those analytes that are not method-defined, different procedures may produce some difference in results. Common examples include the differences in recoveries of phenolic compounds extracted from water by separatory funnel (Method 3510) and continuous liquid-liquid (Method 3520) extraction techniques, differences in recoveries of many compounds between Soxhlet (Method 3540) and ultrasonic (Method 3550) extraction techniques, and differences resulting from the choice of acid digestion of metals (Method 3050) or microwave digestion (Method 3051). Where practical, the Agency has included guidance in the individual methods regarding known potential problems, and analysts are advised to review this information carefully in choosing or modifying analytical procedures. Chapter One describes a variety of QC procedures that may be used to evaluate the quality of the analytical results. Additional QC procedures may be described in the individual methods. The results of these QC procedures should be used by the analyst to evaluate if the choice of the analytical procedures and/or any modifications are appropriate to generate data of the quality necessary to satisfy the data quality needs of the intended application.

The performance data included in the SW-846 methods are not intended to be used as absolute QC acceptance criteria for method performance. The data are intended to be guidance, by providing typical method performance in typical matrices, to assist the analyst in selection of the appropriate method for the intended application. In addition, it is the responsibility of the laboratory to establish actual operating parameters and in-house QC acceptance criteria, based on its own laboratory SOPs and in-house QC program, to demonstrate appropriate performance of the methods used in that laboratory for the RCRA analytical applications for which they are intended.

The regulated community is further advised that the methods here or from other sources need only be used for those specific analytes of concern that are subject to regulation or other monitoring requirements. The fact that a method provides a long list of analytes does not mean that each of those analytes is subject to any or all regulations, or that all of those analytes must be analyzed each time the method is employed, or that all of the analytes can be analyzed using a single sample preparation procedure. It is EPA's intention that the target analyte list for any procedure includes those analytes necessary to meet the data quality objectives of the project, i.e., those analytes subject to monitoring requirements and set out in a RCRA permit (or other applicable regulation), plus those analytes used in the methods for QC purposes, such as surrogates, internal standards, system performance check compounds, etc. Additional analytes, not included on the analyte list of a particular method(s) but needed for a specific project, may be analyzed by that particular method(s), if appropriate performance can be demonstrated for the analytes of concern in the matrices of concern at the levels of concern.

#### 2.1.1 Trace Analysis vs. Macroanalysis

Through the choice of sample size and concentration procedures, the methods presented in SW-846 were designed to address the problem of "trace" analyses (<1000 ppm), and have been developed for an optimized working range. These methods are also applicable to "minor" (1000 ppm - 10,000 ppm) and "major" (>10,000 ppm) analyses, as well, through use of appropriate sample preparation techniques that result in analyte concentrations within that optimized range. Such sample preparation techniques include:

- 1) adjustment of size of sample prepared for analysis (for homogeneous samples),
- 2) adjustment of injection volumes,
- 3) dilution or concentration of sample,
- 4) elimination of concentration steps prescribed for "trace" analyses, and
- 5) direct injection (of samples to be analyzed for volatile constituents).

The performance data presented in each of these methods were generated from "trace" analyses, and may not be applicable to "minor" and "major" analyses. Generally, extraction efficiency improves as concentration increases.

**CAUTION:** Great care should be taken when performing trace analyses after the analysis of concentrated samples, given the possibility of contamination.

#### 2.1.2 Choice of Apparatus and Preparation of Reagents

Since many types and sizes of glassware and supplies are commercially available, and since it is possible to prepare reagents and standards in many different ways, the apparatus, reagents, and volumes specified in these methods may be replaced by any similar types as long as this substitution does not affect the overall quality of the analyses.

#### 2.1.3 Quality Control Criteria Precedence

Chapter One contains general quality control (QC) guidance for analyses using SW-846 methods. QC guidance specific to a given analytical technique (e.g., extraction, cleanup, sample introduction, or analysis) may be found in Methods 3500, 3600, 5000, 7000, and 8000. Method-specific QC criteria may be found in Sec. 8.0 of each individual method (or in Sec. 11.0 of air sampling methods). When inconsistencies exist between the information in these locations, method-specific QC criteria take precedence over both technique-specific criteria and those criteria given in Chapter One, and technique-specific QC criteria take precedence over the criteria in Chapter One.

## 2.2 REQUIRED INFORMATION

In order to choose the correct combination of methods to comprise the appropriate analytical procedure, some basic information is required.

#### 2.2.1 Physical State(s) of Sample

The phase characteristics of the sample must be known. There are several general categories of phases into which the sample may be categorized, including:

Aqueous	Oil or other Organic Liquid
Sludge	Stack Sampling (VOST) Condensate
TCLP or EP Extract	Multiphase Sample
Solid	
Ground Water	

There may be a substantial degree of overlap between the phases listed above and it may be useful to further divide these phases in certain instances. A multiphase sample may be a

combination of aqueous, organic liquid, sludge, and/or solid phases, and generally must undergo a phase separation as the first step in the analytical procedure.

#### **2.2.2 Analytes**

Analytes may be divided into various classes based on the determinative methods which are used to identify and quantify them. The most basic differentiation is between organic (e.g., carbon-containing) analytes and inorganic (e.g., metals and anions) analytes.

Table 2-1 is an alphabetical list of analytes cited within the SW-846 organic determinative methods (excludes immunoassay and other screening methods). These analytes have been evaluated by those methods. The methods may also be applicable to other analytes that are similar to those listed. Tables 2-2 through 2-32 list the analytes for each organic determinative method.

Table 2-33 indicates which methods are applicable to inorganic analytes.

#### **2.2.3 Detection Limits**

Some regulations may require a specific sensitivity or detection limit for an analysis, as in the determination of analytes for the Toxicity Characteristic (TC). Drinking water detection limits, for those specific organic and metallic analytes covered by the National Primary Drinking Water Regulations, are desired in the analysis of ground water.

#### **2.2.4 Analytical Objective**

Knowledge of the analytical objective will be useful in the choice of sample preparation procedures and in the selection of a determinative method. This is especially true when the sample has more than one phase. Knowledge of the analytical objective may not be possible or desirable at all management levels, but that information should be transmitted to the analytical laboratory management to ensure that the correct techniques are used during the analytical effort.

#### **2.2.5 Detection and Monitoring**

The strategy for detection of compounds in environmental or process samples may be contrasted with the strategy for collecting monitoring data. Detection samples define initial conditions. When there is little information available about the composition of the sample source, e.g., a well or process stream, mass spectral identification of organic analytes leads to fewer false positive results. Thus, the most practical form of detection for organic analytes is often mass spectral identification. However, where the sensitivity requirements exceed those that can be achieved using mass spectral method (e.g., GC/MS or HPLC/MS), it may be necessary to employ a more sensitive detection method (e.g., electron capture). In these instances, the risk of false positive results may be minimized by confirming the results through a second analysis with a dissimilar detector or chromatographic column. Thus, the choice of technique for organic analytes may be governed by the detection limit requirements and potential interferants.

Similarly, the choice of technique for metals is governed by the detection limit requirements and potential interferants.

In contrast, monitoring samples are analyzed to confirm existing and on-going conditions, tracking the presence or absence of known constituents in an environmental or process matrix. In well-defined matrices and under stable analytical conditions, less compound-specific detection modes may be used, as the risk of false positive results is less.

### **2.2.6 Sample Containers, Preservations, and Holding Times**

Appropriate sample containers, sample preservation techniques, and sample holding times for aqueous matrices are listed in Table 2-34, near the end of this chapter. Similar information may be found in Table 3-1 of Chapter Three (inorganic analytes) and Table 4-1 of Chapter Four (organic analytes). Samples must be extracted and analyzed within the specified holding times for the results to be considered reflective of total concentrations. Analytical data generated outside of the specified holding times must be considered to be minimum values only. Such data may be used to demonstrate that a waste is hazardous where it shows the concentration of a constituent to be above the regulatory threshold but cannot be used to demonstrate that a waste is not hazardous.

## **2.3 IMPLEMENTING THE GUIDANCE**

The choice of the appropriate sequence of methods depends on the information required and on the experience of the analyst. Figure 2-1 summarizes the organic analysis options available. Appropriate selection is confirmed by the quality control results. The use of the recommended procedures, whether they are approved or mandatory, does not release the analyst from demonstrating the correct execution of the method.

### **2.3.1 Extraction and Sample Preparation Procedures for Organic Analytes**

Methods for preparing samples for organic analytes are shown in Table 2-35. Method 3500 and associated methods should be consulted for further details on preparing the sample for analysis.

#### **2.3.1.1 Aqueous Samples**

Methods 3510 and 3520 may be used for extraction of the semivolatile organic compounds from aqueous samples. The choice of a preparative method depends on the sample. Method 3510, a separatory funnel liquid-liquid extraction technique, is appropriate for samples which will not form a persistent emulsion interface between the sample and the extraction solvent. The formation of an emulsion that cannot be broken up by mechanical techniques will prevent proper extraction of the sample. Method 3520, a continuous liquid-liquid extraction technique, may be used for any aqueous sample and will minimize emulsion formation.

Method 3535 is solid-phase extraction technique that has been tested for organochlorine pesticides and phthalate esters and may be applicable to other semivolatile and extractable compounds as well. The aqueous sample is passed through a solid sorbent material which traps the analytes. They are then eluted from the solid-phase sorbent with a small volume of organic solvent. This technique may be used to minimize the volumes of organic solvents that are employed, but may not be appropriate for aqueous samples with high suspended solids contents.

### 2.3.1.1.1 Basic or Neutral Extraction of Semivolatile Analytes

The solvent extract obtained by performing Method 3510, 3520, or 3535 at a neutral or basic pH will contain the neutral organic compounds and the organic bases of interest. Refer to Table 1 in the extraction methods (3510 and/or 3520) for guidance on the requirements for pH adjustment prior to extraction and analysis.

### 2.3.1.1.2 Acidic Extraction of Phenols and Acid Analytes

The solvent extract obtained by performing Method 3510, 3520, or 3535 at a pH less than or equal to 2 will contain the phenols and acid extractable organics of interest.

### 2.3.1.2 Solid Samples

Soxhlet extraction (Methods 3540 and 3541), ultrasonic extraction (Method 3550), and accelerated solvent extraction (Method 3545) may be used with solid samples. Consolidated samples should be ground finely enough to pass through a 1 mm sieve. In limited applications, waste dilution (Methods 3580 and 3585) may be used if the entire sample is soluble in the specified solvent.

Methods 3540, 3541, 3545, and 3550 are neutral-pH extraction techniques and therefore, depending on the analysis requirements, acid-base partition cleanup (Method 3650) may be necessary. Method 3650 will only be needed if chromatographic interferences are severe enough to prevent detection of the analytes of interest. This separation will be most important if a GC method is chosen for analysis of the sample. If GC/MS is used, the ion selectivity of the technique may compensate for chromatographic interferences.

There are two extraction procedures for solid samples that employ supercritical fluid extraction (SFE). Method 3560 is a technique for the extraction of petroleum hydrocarbons from various solid matrices using carbon dioxide at elevated temperature and pressure. Method 3561 may be used to extract polynuclear aromatic hydrocarbons (PAHs) from solid matrices using supercritical carbon dioxide.

### 2.3.1.3 Oils and Organic Liquids

Method 3580, waste dilution, may be used to prepare oils and organic liquid samples for analysis of semivolatile and extractable organic analytes by GC or GC/MS. Method 3585 may be employed for the preparation of these matrices for volatiles analysis by GC or GC/MS. To avoid overloading the analytical detection system, care must be exercised to ensure that proper dilutions are made. Methods 3580 and 3585 give guidance on performing waste dilutions.

To remove interferences for semivolatiles and extractables, Method 3611 (Alumina cleanup) may be performed on an oil sample directly, without prior sample preparation.

Method 3650 is the only other preparative procedure for oils and other organic liquids. This procedure is a back extraction into an aqueous phase. It is generally introduced as a cleanup procedure for extracts rather than as a preparative procedure. Oils generally have

a high concentration of semivolatile compounds and, therefore, preparation by Method 3650 should be done on a relatively small aliquot of the sample. Generally, extraction of 1 mL of oil will be sufficient to obtain a saturated aqueous phase and avoid emulsions.

#### 2.3.1.4      Sludge Samples

Determining the appropriate methods for analysis of sludges is complicated because of the lack of precise definitions of sludges with respect to the relative percent of liquid and solid components. There is no set ratio of liquid to solid which enables the analyst to determine which of the three extraction methods cited is the most appropriate. Sludges may be classified into three categories: liquid sludges, solid sludges, and emulsions, but with appreciable overlap.

If the sample is an organic sludge (solid material and organic liquid, as opposed to an aqueous sludge), the sample should be handled as a multiphase sample.

##### 2.3.1.4.1      Liquid Sludges

Use of Method 3510 or Method 3520 may be applicable to sludges that behave like and have the consistency of aqueous liquids. Ultrasonic extraction (Method 3550) and Soxhlet (Method 3540) procedures will, most likely, be ineffective because of the overwhelming presence of the liquid aqueous phase.

##### 2.3.1.4.2      Solid Sludges

Soxhlet extraction (Methods 3540 and 3541), accelerated solvent (Method 3545) extraction, and ultrasonic extraction (Method 3550) will be more effective when applied to sludge samples that resemble solids. Samples may be dried or centrifuged to form solid materials for subsequent determination of semivolatile compounds.

Using Method 3650, Acid-Base Partition Cleanup, on the extract may be necessary, depending on whether chromatographic interferences prevent determination of the analytes of interest.

##### 2.3.1.4.3      Emulsions

Attempts should be made to break up and separate the phases of an emulsion. Several techniques are effective in breaking emulsions or separating the phases of emulsions, including:

1. Freezing/thawing: Certain emulsions will separate if exposed to temperatures below 0°C.
2. Salting out: Addition of a salt to make the aqueous phase of an emulsion too polar to support a less polar phase promotes separation.
3. Centrifugation: Centrifugal force may separate emulsion components by density.

4. Addition of water or ethanol: Emulsion polymers may be destabilized when a preponderance of the aqueous phase is added.
5. Forced filtering through glass wool: Many emulsions can be broken by forcing the emulsion through a pad of Pyrex glass wool in a drying column using a slight amount of air pressure (using a rubber bulb usually provides sufficient pressure).

If techniques for breaking emulsions fail, use Method 3520. If the emulsion can be broken, the different phases (aqueous, solid, or organic liquid) may then be analyzed separately.

#### 2.3.1.5 Multiphase Samples

Choice of the procedure for separating multiphase samples is highly dependent on the objective of the analysis. With a sample in which some of the phases tend to separate rapidly, the percent weight or volume of each phase should be calculated and each phase should be individually analyzed for the required analytes.

An alternate approach is to obtain a homogeneous sample and attempt a single analysis on the combination of phases. This approach will give no information on the abundance of the analytes in the individual phases other than what can be implied by solubility.

A third alternative is to select phases of interest and to analyze only those selected phases. This tactic must be consistent with the sampling/analysis objectives or it will yield insufficient information for the time and resources expended. The phases selected should be compared with Figure 2-1 and Table 2-35 for further guidance.

#### 2.3.2 Cleanup Procedures

Each category in Table 2-36, Cleanup Methods for Organic Analyte Extracts, corresponds to one of the possible determinative methods available in the manual. Cleanups employed are determined by the analytes of interest within the extract. However, the necessity of performing cleanup may also depend upon the matrix from which the extract was developed. Cleanup of a sample may be done exactly as instructed in the cleanup method for some of the analytes. There are some instances when cleanup using one of the methods may only proceed after the procedure is modified to optimize recovery and separation. Several cleanup techniques may be possible for each analyte category. The information provided is not meant to imply that any or all of these methods must be used for the analysis to be acceptable. Extracts with components which interfere with spectral or chromatographic determinations are expected to be subjected to cleanup procedures.

The analyst's discretion must determine the necessity for cleanup procedures, as there are no clear cut criteria for indicating their use. Method 3600 and associated methods should be consulted for further details on extract cleanup.

### **2.3.3 Determinative Procedures**

The determinative methods for organic analytes have been divided into three categories, as shown in Table 2-37: gas chromatography/mass spectrometry (GC/MS); specific detection methods, i.e., gas chromatography (GC) with specific non-MS detectors; and high performance liquid chromatography (HPLC). This division is intended to help an analyst choose which determinative method will apply. Under each analyte column, SW-846 method numbers have been indicated, if appropriate, for the determination of the analyte. A blank has been left if no chromatographic determinative method is available.

Generally, the MS procedures are more specific but less sensitive than the appropriate gas chromatographic/specific detection method.

Method 8000 gives a general description of the techniques of gas chromatography and high performance liquid chromatography. Method 8000 should be consulted prior to application of any of the gas chromatographic methods.

Method 8081 (organochlorine pesticides), Method 8082 (polychlorinated biphenyls), Method 8141 (organophosphorus pesticides), and Method 8151 (chlorinated herbicides), are preferred over GC/MS because of the combination of selectivity and sensitivity of the flame photometric, nitrogen-phosphorus, and electron capture detectors.

Method 8260 is a GC/MS method for volatile analytes, which employs a capillary column. A variety of sample introduction techniques may be used with Method 8260, including Methods 5021, 5030, 5031, 5035, and 3585. A GC with a selective detector is also useful for the determination of volatile organic compounds in a monitoring scenario, as described in Sec. 2.2.5.

Method 8270 is a GC/MS method for semivolatile analytes, which employs a capillary column.

Table 2-37 lists several GC and HPLC methods that apply to only a small number of analytes. Methods 8031 and 8033 are GC methods for acrolein, acrylonitrile, and acetonitrile. Methods 8315 and 8316 are HPLC methods for these three analytes. Method 8316 also addresses acrylamide, which may be analyzed by Method 8032.

HPLC methods have been developed for other types of analytes, most notably carbamates (Method 8318); azo dyes, phenoxy acid herbicides, carbamates, and organophosphorus pesticides (Method 8321); PAHs (Method 8310); explosives (Methods 8330, 8331, and 8332); and some volatile organics (Methods 8315 and 8316).

Method 8430 utilizes a Fourier Transform Infrared Spectrometer (FT-IR) coupled to a gas chromatograph to determine bis(2-chloroethyl) ether and its hydrolysis products. The sample is introduced by direct aqueous injection. Method 8440 may be employed for the determination of total recoverable petroleum hydrocarbons (TRPH) in solid samples by infrared (IR) spectrophotometry. The samples may be extracted with supercritical carbon dioxide, using Method 3560.

## 2.4 CHARACTERISTICS

Figure 2-2 outlines a sequence for determining if a waste exhibits one or more of the characteristics of a hazardous waste.

### 2.4.1 EP and TCLP extracts

The leachate obtained from using either the EP (Figure 2-3A) or the TCLP (Figure 2-3B) is an aqueous sample, and therefore, requires further solvent extraction prior to the analysis of semivolatile compounds.

The TCLP leachate is solvent extracted with methylene chloride at a pH > 11 and at a pH < 2 by either Method 3510 or 3520. Method 3510 should be used unless the formation of emulsions between the sample and the solvent prevent proper extraction. If this problem is encountered, Method 3520 should be employed.

The solvent extract obtained by performing either Method 3510 or 3520 at a basic or neutral pH will contain the base/neutral compounds of interest. Refer to the specific determinative method for guidance on the pH requirements for extraction prior to analysis. Method 5031 (Azeotropic Distillation) may be used as an effective preparative method for pyridine.

Due to the high concentration of acetate in the TCLP extract, it is recommended that purge-and-trap be used to introduce the volatile sample into the gas chromatograph.

## 2.5 GROUND WATER

Appropriate analysis schemes for the determination of analytes in ground water are presented in Figures 2-4A, 2-4B, and 2-4C. Quantitation limits for the inorganic analytes should correspond to the drinking water limits which are available.

### 2.5.1 Special Techniques for Inorganic Analytes

All atomic absorption analyses should employ appropriate background correction systems whenever spectral interferences could be present. Several background correction techniques are employed in modern atomic absorption spectrometers. Matrix modification can complement background correction in some cases. Since no approach to interference correction is completely effective in all cases, the analyst should attempt to verify the adequacy of correction. If the interferant is known (e.g., high concentrations of iron in the determination of selenium), accurate analyses of synthetic solutions of the interferant (with and without analyte) could establish the efficacy of the background correction. If the nature of the interferant is not established, good agreement of analytical results using two substantially different wavelengths could substantiate the adequacy of the background correction.

To reduce matrix interferences, all graphite furnace atomic absorption (GFAA) analyses should be performed using techniques which maximize an isothermal environment within the furnace cell. Data indicate that two such techniques, L'vov platform and the Delayed Atomization Cuvette (DAC), are equivalent in this respect, and produce high quality results.

All furnace atomic absorption analysis should be carried out using the best matrix modifier for the analysis. Some examples of modifiers are listed below. (See also the appropriate methods.)

<u>Element(s)</u>	<u>Modifier(s)</u>
As and Se	Nickel nitrate, palladium
Pb	Phosphoric acid, ammonium phosphate, palladium
Cd	Ammonium phosphate, palladium
Sb	Ammonium nitrate, palladium
Tl	Platinum, palladium

ICP, AA, and GFAA calibration standards must match the acid composition and strength of the acids contained in the samples. Acid strengths of the calibration standards should be stated in the raw data. When using a method which permits the use of internal standardization, and the internal standardization option is being used, matrix matching is not required.

## 2.6 ADDITIONAL GUIDANCE REGARDING INORGANIC ANALYSES

Methods for preparing different sample matrices for inorganic analytes are shown in Table 2-38. Guidance regarding the use of leaching and digestive methods for inorganic analysis is provided in Table 2-39.

## 2.7 REFERENCES

1. Barcelona, M.J. "TOC Determinations in Ground Water"; Ground Water 1984, 22(1), 18-24.
2. Riggin, R.; et al. Development and Evaluation of Methods for Total Organic Halide and Purgeable Organic Halide in Wastewater; U.S. Environmental Protection Agency. Office of Research and Development. Environmental Monitoring and Support Laboratory. ORD Publication Offices of Center for Environmental Research Information: Cincinnati, OH, 1984; EPA-600/4-84-008.
3. McKee, G.; et al. Determination of Inorganic Anions in Water by Ion Chromatography; (Technical addition to Methods for Chemical Analysis of Water and Wastewater, EPA 600/4-79-020), U.S. Environmental Protection Agency. Environmental Monitoring and Support Laboratory. ORD Publication Offices of Center for Environmental Research Information: Cincinnati, OH, 1984; EPA-600/4-84-017.

TABLE 2-1  
DETERMINATIVE METHODS FOR ORGANIC ANALYTES

Analyte	Applicable Method(s)
Acenaphthene . . . . .	8100, 8270, 8275, 8310, 8410
Acenaphthylene . . . . .	8100, 8270, 8275, 8310, 8410
Acetaldehyde . . . . .	8315
Acetone . . . . .	8015, 8260, 8315
Acetonitrile . . . . .	8015, 8033, 8260
Acetophenone . . . . .	8270
2-Acetylaminofluorene . . . . .	8270
1-Acetyl-2-thiourea . . . . .	8270
Acfifluorfen . . . . .	8151
Acrolein (Propenal) . . . . .	8015, 8260, 8315, 8316
Acrylamide . . . . .	8032, 8316
Acrylonitrile . . . . .	8015, 8031, 8260, 8316
Alachlor . . . . .	8081
Aldicarb (Temik) . . . . .	8318, 8321
Aldicarb sulfone . . . . .	8318, 8321
Aldicarb sulfoxide . . . . .	8321
Aldrin . . . . .	8081, 8270
Allyl alcohol . . . . .	8015, 8260
Allyl chloride . . . . .	8021, 8260
2-Aminoanthraquinone . . . . .	8270
Aminoazobenzene . . . . .	8270
4-Aminobiphenyl . . . . .	8270
Aminocarb . . . . .	8321
2-Amino-4,6-dinitrotoluene (2-Am-DNT) . . . . .	8330
4-Amino-2,6-dinitrotoluene (4-Am-DNT) . . . . .	8330
3-Amino-9-ethylcarbazole . . . . .	8270
Anilazine . . . . .	8270
Aniline . . . . .	8131, 8270
o-Anisidine . . . . .	8270
Anthracene . . . . .	8100, 8270, 8275, 8310, 8410
Aramite . . . . .	8270
Aroclor-1016 (PCB-1016) . . . . .	8082, 8270
Aroclor-1221 (PCB-1221) . . . . .	8082, 8270
Aroclor-1232 (PCB-1232) . . . . .	8082, 8270
Aroclor-1242 (PCB-1242) . . . . .	8082, 8270
Aroclor-1248 (PCB-1248) . . . . .	8082, 8270
Aroclor-1254 (PCB-1254) . . . . .	8082, 8270
Aroclor-1260 (PCB-1260) . . . . .	8082, 8270
Aspon . . . . .	8141
Asulam . . . . .	8321
Atrazine . . . . .	8141
Azinphos-ethyl . . . . .	8141
Azinphos-methyl . . . . .	8141, 8270
Barban . . . . .	8270, 8321
Baygon (Propoxur) . . . . .	8318, 8321
Bendiocarb . . . . .	8321

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Benefin . . . . .	8091
Benomyl . . . . .	8321
Bentazon . . . . .	8151
Benzal chloride . . . . .	8121
Benzaldehyde . . . . .	8315
Benz(a)anthracene . . . . .	8100, 8270, 8275, 8310, 8410
Benzene . . . . .	8021, 8260
Benzenethiol (Thiophenol) . . . . .	8270
Benzidine . . . . .	8270, 8325
Benzo(b)fluoranthene . . . . .	8100, 8270, 8275, 8310
Benzo(j)fluoranthene . . . . .	8100
Benzo(k)fluoranthene . . . . .	8100, 8270, 8275, 8310
Benzoic acid . . . . .	8270, 8410
Benzo(g,h,i)perylene . . . . .	8100, 8270, 8275, 8310
Benzo(a)pyrene . . . . .	8100, 8270, 8275, 8310, 8410
p-Benzoquinone . . . . .	8270
Benzotrichloride . . . . .	8121
Benzoylprop ethyl . . . . .	8325
Benzyl alcohol . . . . .	8270
Benzyl chloride . . . . .	8021, 8121, 8260
$\alpha$ -BHC ( $\alpha$ -Hexachlorocyclohexane) . . . . .	8081, 8121, 8270
$\beta$ -BHC ( $\beta$ -Hexachlorocyclohexane) . . . . .	8081, 8121, 8270
$\delta$ -BHC ( $\delta$ -Hexachlorocyclohexane) . . . . .	8081, 8121, 8270
$\gamma$ -BHC (Lindane, $\gamma$ -Hexachlorocyclohexane) . . . . .	8081, 8121, 8270
Bis(2-chloroethoxy)methane . . . . .	8111, 8270, 8410
Bis(2-chloroethyl) ether . . . . .	8111, 8270, 8410, 8430
Bis(2-chloroethyl)sulfide . . . . .	8260
Bis(2-chloroisopropyl) ether . . . . .	8021, 8111, 8270, 8410
Bis(2-n-butoxyethyl) phthalate . . . . .	8061
Bis(2-ethoxyethyl) phthalate . . . . .	8061
Bis(2-ethylhexyl) phthalate . . . . .	8061, 8270, 8410
Bis(2-methoxyethyl) phthalate . . . . .	8061
Bis(4-methyl-2-pentyl)-phthalate . . . . .	8061
Bolstar (Sulprofos) . . . . .	8141
Bromacil . . . . .	8321
Bromoacetone . . . . .	8021, 8260
4-Bromoaniline . . . . .	8131
Bromobenzene . . . . .	8021, 8260
Bromochloromethane . . . . .	8021, 8260
2-Bromo-6-chloro-4-nitroaniline . . . . .	8131
Bromodichloromethane . . . . .	8021, 8260
2-Bromo-4,6-dinitroaniline . . . . .	8131
Bromoform . . . . .	8021, 8260
Bromomethane . . . . .	8021, 8260
4-Bromophenyl phenyl ether . . . . .	8111, 8270, 8275, 8410
Bromoxynil . . . . .	8270

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Butanal . . . . .	8315
1-Butanol (n-Butyl alcohol) . . . . .	8015
n-Butanol . . . . .	8260
2-Butanone (Methyl ethyl ketone, MEK) . . . . .	8015, 8260
Butralin . . . . .	8091
n-Butyl alcohol (1-Butanol) . . . . .	8015
t-Butyl alcohol . . . . .	8015
n-Butylbenzene . . . . .	8021, 8260
sec-Butylbenzene . . . . .	8021, 8260
tert-Butylbenzene . . . . .	8021, 8260
Butyl benzyl phthalate . . . . .	8061, 8270, 8410
2-sec-Butyl-4,6-dinitrophenol (DNBP, Dinoseb) . . . . .	8041, 8151, 8270, 8321
Caffeine . . . . .	8321
Captafol . . . . .	8081, 8270
Captan . . . . .	8270
Carbaryl (Sevin) . . . . .	8270, 8318, 8321, 8325
Carbendazim . . . . .	8321
Carbofuran (Furaden) . . . . .	8270, 8318, 8321
Carbon disulfide . . . . .	8260
Carbon tetrachloride . . . . .	8021, 8260
Carbophenothion . . . . .	8141, 8270
Chloral hydrate . . . . .	8260
Chloramben . . . . .	8151
Chlordane (NOS) . . . . .	8270
$\alpha$ -Chlordane . . . . .	8081
$\gamma$ -Chlordane . . . . .	8081
Chlорfenvinphos . . . . .	8141, 8270
Chloroacetonitrile . . . . .	8260
2-Chloroaniline . . . . .	8131
3-Chloroaniline . . . . .	8131
4-Chloroaniline . . . . .	8131, 8270, 8410
Chlorobenzene . . . . .	8021, 8260
Chlorobenzilate . . . . .	8081, 8270
2-Chlorobiphenyl . . . . .	8082, 8275
2-Chloro-1,3-butadiene (Chloroprene) . . . . .	8021, 8260
1-Chlorobutane . . . . .	8260
Chlorodibromomethane (Dibromochloromethane) . . . . .	8021, 8260
2-Chloro-4,6-dinitroaniline . . . . .	8131
1-Chloro-2,4-dinitrobenzene . . . . .	8091
1-Chloro-3,4-dinitrobenzene . . . . .	8091
Chloroethane . . . . .	8021, 8260
2-Chloroethanol . . . . .	8021, 8260, 8430
2-(2-Chloroethoxy)ethanol . . . . .	8430
2-Chloroethyl vinyl ether . . . . .	8021, 8260
Chloroform . . . . .	8021, 8260
1-Chlorohexane . . . . .	8260

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Chloromethane . . . . .	8021, 8260
5-Chloro-2-methylaniline . . . . .	8270
Chloromethyl methyl ether . . . . .	8021
2-Chloro-5-methylphenol . . . . .	8041
4-Chloro-2-methylphenol . . . . .	8041
4-Chloro-3-methylphenol . . . . .	8041, 8270, 8410
3-(Chloromethyl)pyridine hydrochloride . . . . .	8270
1-Choronaphthalene . . . . .	8270, 8275
2-Choronaphthalene . . . . .	8121, 8270, 8410
Chloroneb . . . . .	8081
2-Chloro-4-nitroaniline . . . . .	8131
4-Chloro-2-nitroaniline . . . . .	8131
1-Chloro-2-nitrobenzene . . . . .	8091
1-Chloro-4-nitrobenzene . . . . .	8091
2-Chloro-6-nitrotoluene . . . . .	8091
4-Chloro-2-nitrotoluene . . . . .	8091
4-Chloro-3-nitrotoluene . . . . .	8091
2-Chlorophenol . . . . .	8041, 8270, 8410
3-Chlorophenol . . . . .	8041
4-Chlorophenol . . . . .	8041, 8410
4-Chloro-1,2-phenylenediamine . . . . .	8270
4-Chloro-1,3-phenylenediamine . . . . .	8270
4-Chlorophenyl phenyl ether . . . . .	8111, 8270, 8410
2-Chlorophenyl 4-nitrophenyl ether . . . . .	8111
3-Chlorophenyl 4-nitrophenyl ether . . . . .	8111
4-Chlorophenyl 4-nitrophenyl ether . . . . .	8111
o-Chlorophenyl thiourea . . . . .	8325
Chloroprene (2-Chloro-1,3-butadiene) . . . . .	8021, 8260
3-Chloropropionitrile . . . . .	8260
Chloropropham . . . . .	8321
Chloropropylate . . . . .	8081
Chlorothalonil . . . . .	8081
2-Chlorotoluene . . . . .	8021, 8260
4-Chlorotoluene . . . . .	8021, 8260
Chloroxuron . . . . .	8321
Chlorpyrifos . . . . .	8141
Chlorpyrifos methyl . . . . .	8141
Chrysene . . . . .	8100, 8270, 8275, 8310, 8410
Coumaphos . . . . .	8141, 8270
Coumarin Dyes . . . . .	8321
p-Cresidine . . . . .	8270
o-Cresol (2-Methylphenol) . . . . .	8041, 8270, 8410
m-Cresol (3-Methylphenol) . . . . .	8041, 8270
p-Cresol (4-Methylphenol) . . . . .	8041, 8270, 8275, 8410
Crotonaldehyde . . . . .	8015, 8260, 8315
Crotoxyphos . . . . .	8141, 8270

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Cyclohexanone . . . . .	8315
2-Cyclohexyl-4,6-dinitrophenol . . . . .	8041, 8270
2,4-D . . . . .	8151, 8321
Dalapon . . . . .	8151, 8321
2,4-DB . . . . .	8151, 8321
DBCP (1,2-Dibromo-3-chloropropane) . . . . .	8011, 8021, 8081, 8260, 8270
2,4-D, butoxyethanol ester . . . . .	8321
DCM (Dichloromethane, Methylene chloride) . . . . .	8021, 8260
DCPA . . . . .	8081
DCPA diacid . . . . .	8151
4,4'-DDD . . . . .	8081, 8270
4,4'-DDE . . . . .	8081, 8270
4,4'-DDT . . . . .	8081, 8270
DDVP (Dichlorvos, Dichlorovos) . . . . .	8141, 8270, 8321
2,2',3,3'4,4'5,5',6,6'-Decachlorobiphenyl . . . . .	8275
Decanal . . . . .	8315
Demeton-O, and Demeton-S . . . . .	8141, 8270
2,4-D, ethylhexyl ester . . . . .	8321
Diallate . . . . .	8081, 8270
Diamyl phthalate . . . . .	8061
2,4-Diaminotoluene . . . . .	8270
Diazinon . . . . .	8141
Dibenz(a,h)acridine . . . . .	8100
Dibenz(a,j)acridine . . . . .	8100, 8270
Dibenz(a,h)anthracene . . . . .	8100, 8270, 8275, 8310
7H-Dibenzo(c,g)carbazole . . . . .	8100
Dibenzofuran . . . . .	8270, 8275, 8410
Dibenzo(a,e)pyrene . . . . .	8100, 8270
Dibenzo(a,h)pyrene . . . . .	8100
Dibenzo(a,i)pyrene . . . . .	8100
Dibenzothiophene . . . . .	8275
Dibromochloromethane (Chlorodibromomethane) . . . . .	8021, 8260
1,2-Dibromo-3-chloropropane (DBCP) . . . . .	8011, 8260, 8270
1,2-Dibromoethane (EDB, Ethylene dibromide) . . . . .	8011, 8021, 8260
Dibromofluoromethane . . . . .	8260
Dibromomethane . . . . .	8021, 8260
2,6-Dibromo-4-nitroaniline . . . . .	8131
2,4-Dibromophenyl 4-nitrophenyl ether . . . . .	8111
Di-n-butyl phthalate . . . . .	8061, 8270, 8410
Dicamba . . . . .	8151, 8321
Dichlone . . . . .	8081, 8270
3,4-Dichloroaniline . . . . .	8131
1,2-Dichlorobenzene . . . . .	8021, 8121, 8260, 8270, 8410
1,3-Dichlorobenzene . . . . .	8021, 8121, 8260, 8270, 8410
1,4-Dichlorobenzene . . . . .	8021, 8121, 8260, 8270, 8410
3,3'-Dichlorobenzidine . . . . .	8270, 8325

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
3,5-Dichlorobenzoic acid . . . . .	8151
2,3-Dichlorobiphenyl . . . . .	8082, 8275
3,3'-Dichlorobiphenyl . . . . .	8275
cis-1,4-Dichloro-2-butene . . . . .	8260
trans-1,4-Dichloro-2-butene . . . . .	8260
Dichlorodifluoromethane . . . . .	8021, 8260
1,1-Dichloroethane . . . . .	8021, 8260
1,2-Dichloroethane . . . . .	8021, 8260
1,1-Dichloroethene (Vinylidene chloride) . . . . .	8021, 8260
cis-1,2-Dichloroethene . . . . .	8021, 8260
trans-1,2-Dichloroethene . . . . .	8021, 8260
Dichlorofenthion . . . . .	8141
Dichloromethane (DCM, Methylene chloride) . . . . .	8021, 8260
2,6-Dichloro-4-nitroaniline . . . . .	8131
2,3-Dichloronitrobenzene . . . . .	8091
2,4-Dichloronitrobenzene . . . . .	8091
3,5-Dichloronitrobenzene . . . . .	8091
3,4-Dichloronitrobenzene . . . . .	8091
2,5-Dichloronitrobenzene . . . . .	8091
2,3-Dichlorophenol . . . . .	8041
2,4-Dichlorophenol . . . . .	8041, 8270, 8410
2,5-Dichlorophenol . . . . .	8041
2,6-Dichlorophenol . . . . .	8041, 8270
3,4-Dichlorophenol . . . . .	8041
3,5-Dichlorophenol . . . . .	8041
2,4-Dichlorophenol 3-methyl-4-nitrophenyl ether . . . . .	8111
2,6-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
3,5-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,5-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,4-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,3-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
3,4-Dichlorophenyl 4-nitrophenyl ether . . . . .	8111
Dichloroprop (Dichlorprop) . . . . .	8151, 8321
1,2-Dichloropropane . . . . .	8021, 8260
1,3-Dichloropropane . . . . .	8021, 8260
2,2-Dichloropropane . . . . .	8021, 8260
1,3-Dichloro-2-propanol . . . . .	8021, 8260
1,1-Dichloropropene . . . . .	8021, 8260
cis-1,3-Dichloropropene . . . . .	8021, 8260
trans-1,3-Dichloropropene . . . . .	8021, 8260
Dichlorovos (DDVP, Dichlorvos) . . . . .	8141, 8270, 8321
Dichlorprop (Dichloroprop) . . . . .	8151, 8321
Dichlorvos (DDVP, Dichlorovos) . . . . .	8141, 8270, 8321
Dicrotophos . . . . .	8141, 8270
Dicofol . . . . .	8081
Dicyclohexyl phthalate . . . . .	8061

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Dieldrin . . . . .	8081, 8270
1,2,3,4-Diepoxybutane . . . . .	8260
Diesel range organics (DRO) . . . . .	8015, 8440
Diethylene glycol . . . . .	8430
Diethyl ether . . . . .	8015, 8260
Diethyl phthalate . . . . .	8061, 8270, 8410
Diethylstilbestrol . . . . .	8270
Diethyl sulfate . . . . .	8270
Dihexyl phthalate . . . . .	8061
Diisobutyl phthalate . . . . .	8061
Dimethoate . . . . .	8141, 8270, 8321
3,3'-Dimethoxybenzidine . . . . .	8270, 8325
Dimethylaminoazobenzene . . . . .	8270
2,5-Dimethylbenzaldehyde . . . . .	8315
7,12-Dimethylbenz(a)anthracene . . . . .	8270
3,3'-Dimethylbenzidine . . . . .	8270, 8325
$\alpha,\alpha$ -Dimethylphenethylamine . . . . .	8270
2,3-Dimethylphenol . . . . .	8041
2,4-Dimethylphenol . . . . .	8041, 8270
2,5-Dimethylphenol . . . . .	8041
2,6-Dimethylphenol . . . . .	8041
3,4-Dimethylphenol . . . . .	8041
Dimethyl phthalate . . . . .	8061, 8270, 8410
Dinitramine . . . . .	8091
2,4-Dinitroaniline . . . . .	8131
1,2-Dinitrobenzene . . . . .	8091, 8270
1,3-Dinitrobenzene (1,3-DNB) . . . . .	8091, 8270, 8330
1,4-Dinitrobenzene . . . . .	8091, 8270
4,6-Dinitro-2-methylphenol . . . . .	8270, 8410
2,4-Dinitrophenol . . . . .	8041, 8270, 8410
2,5-Dinitrophenol . . . . .	8041
2,4-Dinitrotoluene (2,4-DNT) . . . . .	8091, 8270, 8330, 8410
2,6-Dinitrotoluene (2,6-DNT) . . . . .	8091, 8270, 8330, 8410
Dinocap . . . . .	8270
Dinonyl phthalate . . . . .	8061
Dinoseb (2-sec-Butyl-4,6-dinitrophenol, DNBP) . . . . .	8041, 8151, 8270, 8321
Di-n-octyl phthalate . . . . .	8061, 8270, 8410
Dioxacarb . . . . .	8318
1,4-Dioxane . . . . .	8015, 8260
Dioxathion . . . . .	8141
Di-n-propyl phthalate . . . . .	8410
Diphenylamine . . . . .	8270
5,5-Diphenylhydantoin . . . . .	8270
1,2-Diphenylhydrazine . . . . .	8270
Disperse Blue 3 . . . . .	8321
Disperse Blue 14 . . . . .	8321

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Disperse Brown 1 . . . . .	8321
Disperse Orange 3 . . . . .	8321
Disperse Orange 30 . . . . .	8321
Disperse Red 1 . . . . .	8321
Disperse Red 5 . . . . .	8321
Disperse Red 13 . . . . .	8321
Disperse Red 60 . . . . .	8321
Disperse Yellow 5 . . . . .	8321
Disulfoton . . . . .	8141, 8270, 8321
Diuron . . . . .	8321, 8325
1,3-DNB (1,3-Dinitrobenzene) . . . . .	8091, 8270, 8330
DNBP (2-sec-Butyl-4,6-dinitrophenol, Dinoseb) . . . . .	8151, 8270, 8321
2,4-DNT (2,4-Dinitrotoluene) . . . . .	8091, 8270, 8275, 8330, 8410
2,6-DNT (2,6-Dinitrotoluene) . . . . .	8091, 8270, 8330, 8410
EDB (1,2-Dibromoethane, Ethylene dibromide) . . . . .	8011, 8021, 8260
Endosulfan I . . . . .	8081, 8270
Endosulfan II . . . . .	8081, 8270
Endosulfan sulfate . . . . .	8081, 8270
Endrin . . . . .	8081, 8270
Endrin aldehyde . . . . .	8081, 8270
Endrin ketone . . . . .	8081, 8270
Epichlorohydrin . . . . .	8021, 8260
EPN . . . . .	8141, 8270
Ethanol . . . . .	8015, 8260
Ethion . . . . .	8141, 8270
Ethoprop . . . . .	8141
Ethyl acetate . . . . .	8015, 8260
Ethylbenzene . . . . .	8021, 8260
Ethyl carbamate . . . . .	8270
Ethyl cyanide (Propionitrile) . . . . .	8015, 8260
Ethylene dibromide (EDB, 1,2-Dibromoethane) . . . . .	8011, 8021, 8260
Ethylene glycol . . . . .	8015, 8430
Ethylene oxide . . . . .	8015, 8260
Ethyl methacrylate . . . . .	8260
Ethyl methanesulfonate . . . . .	8270
Etridiazole . . . . .	8081
Famphur . . . . .	8141, 8270, 8321
Fenitrothion . . . . .	8141
Fensulfothion . . . . .	8141, 8270, 8321
Fenthion . . . . .	8141, 8270
Fenuron . . . . .	8321
Fluchloralin . . . . .	8270
Fluometuron . . . . .	8321
Fluoranthene . . . . .	8100, 8270, 8275, 8310, 8410
Fluorene . . . . .	8100, 8270, 8275, 8310, 8410
Fluorescent Brightener 61 . . . . .	8321

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
Fluorescent Brightener 236 . . . . .	8321
Fonophos . . . . .	8141
Formaldehyde . . . . .	8315
Furaden (Carbofuran) . . . . .	8270, 8318, 8321
Gasoline range organics (GRO) . . . . .	8015
Halowax-1000 . . . . .	8081
Halowax-1001 . . . . .	8081
Halowax-1013 . . . . .	8081
Halowax-1014 . . . . .	8081
Halowax-1051 . . . . .	8081
Halowax-1099 . . . . .	8081
Heptachlor . . . . .	8081, 8270
2,2',3,3',4,4',5-Heptachlorobiphenyl . . . . .	8082, 8275
2,2',3,4,4',5,5'-Heptachlorobiphenyl . . . . .	8082, 8275
2,2',3,4,4',5',6-Heptachlorobiphenyl . . . . .	8082
2,2',3,4',5,5',6-Heptachlorobiphenyl . . . . .	8082, 8275
Heptachlor epoxide . . . . .	8081, 8270
Heptanal . . . . .	8315
Hexachlorobenzene . . . . .	8081, 8121, 8270, 8275, 8410
2,2',3,3,4,4'-Hexachlorobiphenyl . . . . .	8275
2,2',3,4,4',5'-Hexachlorobiphenyl . . . . .	8082, 8275
2,2',3,4,5,5'-Hexachlorobiphenyl . . . . .	8082
2,2',3,5,5',6-Hexachlorobiphenyl . . . . .	8082
2,2',4,4',5,5'-Hexachlorobiphenyl . . . . .	8082
Hexachlorobutadiene . . . . .	8021, 8121, 8260, 8270, 8410
$\alpha$ -Hexachlorocyclohexane ( $\alpha$ -BHC) . . . . .	8081, 8121, 8270
$\beta$ -Hexachlorocyclohexane ( $\beta$ -BHC) . . . . .	8081, 8121, 8270
$\delta$ -Hexachlorocyclohexane ( $\delta$ -BHC) . . . . .	8081, 8121, 8270
$\gamma$ -Hexachlorocyclohexane ( $\gamma$ -BHC, Lindane) . . . . .	8081, 8121, 8270
Hexachlorocyclopentadiene . . . . .	8081, 8121, 8270, 8410
Hexachloroethane . . . . .	8121, 8260, 8270, 8410
Hexachlorophene . . . . .	8270
Hexachloropropene . . . . .	8270
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) . . . . .	8330
Hexamethylphosphoramide (HMPA) . . . . .	8141, 8270
Hexanal . . . . .	8315
2-Hexanone . . . . .	8260
Hexyl 2-ethylhexyl phthalate . . . . .	8061
HMPA (Hexamethyl phosphoramide) . . . . .	8141, 8270
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine) . . . . .	8330
1,2,3,4,6,7,8-HpCDD . . . . .	8280, 8290
HpCDD, total . . . . .	8280, 8290
1,2,3,4,6,7,8-HpCDF . . . . .	8280, 8290
1,2,3,4,7,8,9-HpCDF . . . . .	8280, 8290
HpCDF, total . . . . .	8280, 8290
1,2,3,4,7,8-HxCDD . . . . .	8280, 8290

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
1,2,3,6,7,8-HxCDD . . . . .	8280, 8290
1,2,3,7,8,9-HxCDD . . . . .	8280, 8290
HxCDD, total . . . . .	8280, 8290
1,2,3,4,7,8-HxCDF . . . . .	8280, 8290
1,2,3,6,7,8-HxCDF . . . . .	8280, 8290
1,2,3,7,8,9-HxCDF . . . . .	8280, 8290
2,3,4,6,7,8-HxCDF . . . . .	8280, 8290
HxCDF . . . . .	8280, 8290
Hydroquinone . . . . .	8270
3-Hydroxycarbofuran . . . . .	8318, 8321
5-Hydroxydicamba . . . . .	8151
2-Hydroxypropionitrile . . . . .	8260
Indeno(1,2,3-cd)pyrene . . . . .	8100, 8270, 8275, 8310
Iodomethane (Methyl iodide) . . . . .	8260
Isobutyl alcohol (2-Methyl-1-propanol) . . . . .	8015, 8260
Isodrin . . . . .	8081, 8270
Isophorone . . . . .	8270, 8410
Isopropalin . . . . .	8091
Isopropyl alcohol (2-Propanol) . . . . .	8015, 8260
Isopropylbenzene . . . . .	8021, 8260
p-Isopropyltoluene . . . . .	8021, 8260
Isosafrole . . . . .	8270
Isovaleraldehyde . . . . .	8315
Kepone . . . . .	8270
Lannate (Methomyl) . . . . .	8318, 8321
Leptophos . . . . .	8141, 8270
Lindane ( $\gamma$ -Hexachlorocyclohexane, $\gamma$ -BHC) . . . . .	8081, 8121, 8270
Linuron (Lorox) . . . . .	8321, 8325
Lorox (Linuron) . . . . .	8321, 8325
Malathion . . . . .	8141, 8270
Maleic anhydride . . . . .	8270
Malononitrile . . . . .	8260
MCPA . . . . .	8151, 8321
MCPP . . . . .	8151, 8321
Merphos . . . . .	8141, 8321
Mestranol . . . . .	8270
Mesurol (Methiocarb) . . . . .	8318, 8321
Methacrylonitrile . . . . .	8260
Methanol . . . . .	8015, 8260
Methapyrilene . . . . .	8270
Methiocarb (Mesurol) . . . . .	8318, 8321
Methomyl (Lannate) . . . . .	8318, 8321
Methoxychlor . . . . .	8081, 8270
Methyl acrylate . . . . .	8260
2-Methyl-1-propanol (Isobutyl alcohol) . . . . .	8015, 8260
Methyl-t-butyl ether . . . . .	8260

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
3-Methylcholanthrene . . . . .	8100, 8270
2-Methyl-4,6-dinitrophenol . . . . .	8041
4,4'-Methylenebis(2-chloroaniline) . . . . .	8270
4,4'-Methylenebis(N,N-dimethylaniline) . . . . .	8270
Methyl ethyl ketone (MEK, 2-Butanone) . . . . .	8015, 8260
Methylene chloride (Dichloromethane, DCM) . . . . .	8021, 8260
Methyl iodide (Iodomethane) . . . . .	8260
Methyl isobutyl ketone (MIBK, 4-Methyl-2-pentanone) . . . . .	8015, 8260
Methyl methacrylate . . . . .	8260
Methyl methanesulfonate . . . . .	8270
2-Methylnaphthalene . . . . .	8270, 8410
Methyl parathion (Parathion, methyl) . . . . .	8270, 8141, 8321
4-Methyl-2-pentanone (MIBK, Methyl isobutyl ketone) . . . . .	8015, 8260
2-Methylphenol (o-Cresol) . . . . .	8041, 8270, 8410
3-Methylphenol (m-Cresol) . . . . .	8041, 8270
4-Methylphenol (p-Cresol) . . . . .	8041, 8270, 8410
2-Methylpyridine (2-Picoline) . . . . .	8015, 8260, 8270
Methyl-2,4,6-trinitrophenylnitramine (Tetryl) . . . . .	8330
Mevinphos . . . . .	8141, 8270
Mexacarbate . . . . .	8270, 8321
MIBK (Methyl isobutyl ketone, 4-Methyl-2-pentanone) . . . . .	8015, 8260
Mirex . . . . .	8081, 8270
Monocrotophos . . . . .	8141, 8270, 8321
Monuron . . . . .	8321, 8325
Naled . . . . .	8141, 8270, 8321
Naphthalene . . . . .	8021, 8100, 8260, 8270, 8275, 8310, 8410
NB (Nitrobenzene) . . . . .	8091, 8260, 8270, 8330, 8410
1,2-Naphthoquinone . . . . .	8091
1,4-Naphthoquinone . . . . .	8270, 8091
1-Naphthylamine . . . . .	8270
2-Naphthylamine . . . . .	8270
Neburon . . . . .	8321
Nicotine . . . . .	8270
5-Nitroacenaphthene . . . . .	8270
2-Nitroaniline . . . . .	8131, 8270, 8410
3-Nitroaniline . . . . .	8131, 8270, 8410
4-Nitroaniline . . . . .	8131, 8270, 8410
5-Nitro-o-anisidine . . . . .	8270
Nitrobenzene (NB) . . . . .	8091, 8260, 8270, 8330, 8410
4-Nitrobiphenyl . . . . .	8270
Nitrofen . . . . .	8081, 8270
Nitroglycerin . . . . .	8332
2-Nitrophenol . . . . .	8041, 8270, 8410
3-Nitrophenol . . . . .	8041
4-Nitrophenol . . . . .	8041, 8151, 8270, 8410
4-Nitrophenyl phenyl ether . . . . .	8111

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
2-Nitropropane . . . . .	8260
Nitroquinoline-1-oxide . . . . .	8270
N-Nitrosodi-n-butylamine . . . . .	8015, 8260, 8270
N-Nitrosodiethylamine . . . . .	8270
N-Nitrosodimethylamine . . . . .	8070, 8270, 8410
N-Nitrosodi-n-butylamine (N-Nitrosodibutylamine) . . . . .	8015, 8260, 8270
N-Nitrosodiphenylamine . . . . .	8070, 8270, 8410
N-Nitrosodi-n-propylamine . . . . .	8070, 8270, 8410
N-Nitrosomethylethylamine . . . . .	8270
N-Nitrosomorpholine . . . . .	8270
N-Nitrosopiperidine . . . . .	8270
N-Nitrosopyrrolidine . . . . .	8270
2-Nitrotoluene (o-Nitrotoluene, 2-NT) . . . . .	8091, 8330
3-Nitrotoluene (m-Nitrotoluene, 3-NT) . . . . .	8091, 8330
4-Nitrotoluene (p-Nitrotoluene, 4-NT) . . . . .	8091, 8330
o-Nitrotoluene (2-Nitrotoluene, 2-NT) . . . . .	8091, 8330
m-Nitrotoluene (3-Nitrotoluene, 3-NT) . . . . .	8091, 8330
p-Nitrotoluene (4-Nitrotoluene, 4-NT) . . . . .	8091, 8330
5-Nitro-o-toluidine . . . . .	8270
<i>trans</i> -Nonachlor . . . . .	8081
2,2'3,3'4,4'5,5'6-Nonachlorobiphenyl . . . . .	8082, 8275
Nonanal . . . . .	8315
2-NT (2-Nitrotoluene, o-Nitrotoluene) . . . . .	8091, 8330
3-NT (3-Nitrotoluene, m-Nitrotoluene) . . . . .	8091, 8330
4-NT (4-Nitrotoluene, p-Nitrotoluene) . . . . .	8091, 8330
OCDD . . . . .	8280, 8290
OCDF . . . . .	8280, 8290
2,2',3,3',4,4'5,5'-Octachlorobiphenyl . . . . .	8275
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) . . . . .	8330
Octamethyl pyrophosphoramide . . . . .	8270
Octanal . . . . .	8315
Oxamyl . . . . .	8321
4,4'-Oxydianiline . . . . .	8270
Paraldehyde . . . . .	8015, 8260
Parathion . . . . .	8270
Parathion, ethyl . . . . .	8141
PCB-1016 (Aroclor-1016) . . . . .	8082, 8270
PCB-1221 (Aroclor-1221) . . . . .	8082, 8270
PCB-1232 (Aroclor-1232) . . . . .	8082, 8270
PCB-1242 (Aroclor-1242) . . . . .	8082, 8270
PCB-1248 (Aroclor-1248) . . . . .	8082, 8270
PCB-1254 (Aroclor-1254) . . . . .	8082, 8270
PCB-1260 (Aroclor-1260) . . . . .	8082, 8270
PCNB . . . . .	8081
1,2,3,7,8-PeCDD . . . . .	8280, 8290
PeCDD, total . . . . .	8280, 8290

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
1,2,3,7,8-PeCDF . . . . .	8280, 8290
2,3,4,7,8-PeCDF . . . . .	8280, 8290
PeCDF, total . . . . .	8280, 8290
Pendimethaline (Penoxalin) . . . . .	8091
Penoxalin (Pendimethaline) . . . . .	8091
Pentachlorobenzene . . . . .	8121, 8270
2,2',3,4,5'-Pentachlorobiphenyl . . . . .	8082
2,2',4,5,5'-Pentachlorobiphenyl . . . . .	8082, 8275
2,3,3',4',6-Pentachlorobiphenyl . . . . .	8082
2,3',4,4',5-Pentachlorobiphenyl . . . . .	8275
Pentachloroethane . . . . .	8260
Pentachloronitrobenzene . . . . .	8091, 8270
Pentachlorophenol . . . . .	8041, 8151, 8270, 8410
Pentafluorobenzene . . . . .	8260
Pentanal (Valeraldehyde) . . . . .	8315
2-Pentanone . . . . .	8015, 8260
Permethrin ( <i>cis</i> and <i>trans</i> ) . . . . .	8081
Perthane . . . . .	8081
Phenacetin . . . . .	8270
Phenanthrene . . . . .	8100, 8270, 8275, 8310, 8410
Phenobarbital . . . . .	8270
Phenol . . . . .	8041, 8270, 8410
1,4-Phenylenediamine . . . . .	8270
Phorate . . . . .	8141, 8270, 8321
Phosalone . . . . .	8270
Phosmet . . . . .	8141, 8270
Phosphamidon . . . . .	8141, 8270
Phthalic anhydride . . . . .	8270
Picloram . . . . .	8151
2-Picoline (2-Methylpyridine) . . . . .	8015, 8260, 8270
Piperonyl sulfoxide . . . . .	8270
Profluralin . . . . .	8091
Promecarb . . . . .	8318
Pronamide . . . . .	8270
Propachlor . . . . .	8081, 8321
Propanal (Propionaldehyde) . . . . .	8315, 8321
1-Propanol . . . . .	8015, 8260
2-Propanol (Isopropyl alcohol) . . . . .	8015, 8260
Propargyl alcohol . . . . .	8260
Propenal (Acrolein) . . . . .	8260, 8315
Propham . . . . .	8321
β-Propiolactone . . . . .	8260
Propionaldehyde (Propanal) . . . . .	8315
Propionitrile (Ethyl cyanide) . . . . .	8015, 8260
Propoxur (Baygon) . . . . .	8318, 8321
n-Propylamine . . . . .	8260

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
n-Propylbenzene . . . . .	8021, 8260
Propylthiouracil . . . . .	8270
Prothiophos (Tokuthion) . . . . .	8141
Pyrene . . . . .	8100, 8270, 8275, 8310, 8410
Pyridine . . . . .	8015, 8260
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine) . . . . .	8330
Resorcinol . . . . .	8270
Ronnel . . . . .	8141
Rotenone . . . . .	8325
Safrole . . . . .	8270
Sevin (Carbaryl) . . . . .	8270, 8318, 8321, 8325
Siduron . . . . .	8321, 8325
Simazine . . . . .	8141
Silvex (2,4,5-TP) . . . . .	8151, 8321
Solvent Red 3 . . . . .	8321
Solvent Red 23 . . . . .	8321
Stirophos (Tetrachlorvinphos) . . . . .	8141, 8270
Strobane . . . . .	8081
Strychnine . . . . .	8270, 8321
Styrene . . . . .	8021, 8260
Sulfallate . . . . .	8270
Sulfotepp . . . . .	8141
Sulprofos (Bolstar) . . . . .	8141
2,4,5-T . . . . .	8151, 8321
2,4,5-T, butoxyethanol ester . . . . .	8321
2,4,5-T, butyl ester . . . . .	8321
2,3,7,8-TCDD . . . . .	8280, 8290
TCDD, total . . . . .	8280, 8290
2,3,7,8-TCDF . . . . .	8280, 8290
TCDF, total . . . . .	8280, 8290
Tebuthiuron . . . . .	8321
Temik (Aldicarb) . . . . .	8318, 8321
Terbufos . . . . .	8141, 8270
1,2,3,4-Tetrachlorobenzene . . . . .	8121
1,2,3,5-Tetrachlorobenzene . . . . .	8121
1,2,4,5-Tetrachlorobenzene . . . . .	8121, 8270
2,2',3,5'-Tetrachlorobiphenyl . . . . .	8082, 8275
2,2',4,5'-Tetrachlorobiphenyl . . . . .	8275
2,2',5,5'-Tetrachlorobiphenyl . . . . .	8082, 8275
2,3',4,4'-Tetrachlorobiphenyl . . . . .	8082, 8275
1,1,1,2-Tetrachloroethane . . . . .	8021, 8260
1,1,2,2-Tetrachloroethane . . . . .	8021, 8260
Tetrachloroethene . . . . .	8021, 8260
2,3,4,5-Tetrachlorophenol . . . . .	8041
2,3,4,6-Tetrachlorophenol . . . . .	8041, 8270
2,3,5,6-Tetrachlorophenol . . . . .	8041

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
2,3,4,5-Tetrachloronitrobenzene . . . . .	8091
2,3,5,6-Tetrachloronitrobenzene . . . . .	8091
Tetrachlorvinphos (Stirophos) . . . . .	8141, 8270
Tetraethyl dithiopyrophosphate . . . . .	8270
Tetraethyl pyrophosphate (TEPP) . . . . .	8141, 8270
Tetrazene . . . . .	8331
Tetryl (Methyl-2,4,6-trinitrophenylnitramine) . . . . .	8330
Thiofanox . . . . .	8321
Thionazin (Zinophos) . . . . .	8141, 8270
Thiophenol (Benzenthiol) . . . . .	8270
1,3,5-TNB (1,3,5-Trinitrobenzene) . . . . .	8270, 8330
2,4,6-TNT (2,4,6-Trinitrobenzene) . . . . .	8330
TOCP (Tri-o-cresylphosphate) . . . . .	8141
Tokuthion (Prothiophos) . . . . .	8141
m-Tolualdehyde . . . . .	8315
o-Tolualdehyde . . . . .	8315
p-Tolualdehyde . . . . .	8315
Toluene . . . . .	8021, 8260
Toluene diisocyanate . . . . .	8270
o-Tolidine . . . . .	8015, 8260, 8270
Toxaphene . . . . .	8081, 8270
2,4,5-TP (Silvex) . . . . .	8151, 8321
2,4,6-Trichloroaniline . . . . .	8131
2,4,5-Trichloroaniline . . . . .	8131
1,2,3-Trichlorobenzene . . . . .	8021, 8121, 8260
1,2,4-Trichlorobenzene . . . . .	8021, 8121, 8260, 8270, 8275, 8410
2,2',5-Trichlorobiphenyl . . . . .	8082, 8275
2,3',5-Trichlorobiphenyl . . . . .	8275
2,4',5-Trichlorobiphenyl . . . . .	8082, 8275
1,3,5-Trichlorobenzene . . . . .	8121
1,1,1-Trichloroethane . . . . .	8021, 8260
1,1,2-Trichloroethane . . . . .	8021, 8260
Trichloroethylene . . . . .	8021, 8260
Trichlorofluoromethane . . . . .	8021, 8260
Trichlorfon . . . . .	8141, 8321
Trichloronate . . . . .	8141
1,2,3-Trichloro-4-nitrobenzene . . . . .	8091
1,2,4-Trichloro-5-nitrobenzene . . . . .	8091
2,4,6-Trichloronitrobenzene . . . . .	8091
2,3,4-Trichlorophenol . . . . .	8041
2,3,5-Trichlorophenol . . . . .	8041
2,3,6-Trichlorophenol . . . . .	8041
2,4,5-Trichlorophenol . . . . .	8041, 8270, 8410
2,4,6-Trichlorophenol . . . . .	8041, 8270, 8410
2,4,6-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,3,6-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111

TABLE 2-1. (Continued)

Analyte	Applicable Method(s)
2,3,5-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,4,5-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111
3,4,5-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111
2,3,4-Trichlorophenyl 4-nitrophenyl ether . . . . .	8111
1,2,3-Trichloropropane . . . . .	8021, 8260
O,O,O-Triethyl phosphorothioate . . . . .	8270
Trifluralin . . . . .	8091, 8081, 8270
2,4,5-Trimethylaniline . . . . .	8270
1,2,4-Trimethylbenzene . . . . .	8021, 8260
1,3,5-Trimethylbenzene . . . . .	8021, 8260
Trimethyl phosphate . . . . .	8270
1,3,5-Trinitrobenzene (1,3,5-TNB) . . . . .	8270, 8330
2,4,6-Trinitrobenzene (2,4,6-TNT) . . . . .	8330
Tris-BP (Tris-(2,3-dibromopropyl) phosphate) . . . . .	8270, 8321
Tri-o-cresylphosphate (TOCP) . . . . .	8141
Tri-p-tolyl phosphate . . . . .	8270
Tris-(2,3-dibromopropyl) phosphate (Tris-BP) . . . . .	8270, 8321
Valeraldehyde (Pentanal) . . . . .	8315
Vinyl acetate . . . . .	8260
Vinyl chloride . . . . .	8021, 8260
Vinylidene chloride (1,1-Dichloroethene) . . . . .	8021, 8260
o-Xylene . . . . .	8021, 8260
m-Xylene . . . . .	8021, 8260
p-Xylene . . . . .	8021, 8260
Zinophos (Thionazin) . . . . .	8141, 8270

TABLE 2-2  
METHOD 8011 (MICROEXTRACTION AND GAS CHROMATOGRAPHY)

---

1,2-Dibromo-3-chloropropane (DBCP)  
1,2-Dibromoethane (EDB)

---

TABLE 2-3  
METHOD 8015 (GC/FID) - NONHALOGENATED VOLATILES

---

Acetone	Isobutyl alcohol
Acetonitrile	Isopropyl alcohol
Acrolein	Methanol
Acrylonitrile	Methyl ethyl ketone (MEK)
Allyl alcohol	Methyl isobutyl ketone (MIBK)
1-Butanol (n-Butyl alcohol)	N-Nitroso-di-n-butylamine
t-Butyl alcohol	Paraldehyde
Crotonaldehyde	2-Pentanone
Diethyl ether	2-Picoline
1,4-Dioxane	1-Propanol
Ethanol	Propionitrile
Ethyl acetate	Pyridine
Ethylene glycol	o-Toluidine
Ethylene oxide	Gasoline range organics (GRO)
	Diesel range organics (DRO)

---

**TABLE 2-4**  
**METHOD 8021 (GC, PHOTOIONIZATION AND ELECTROLYTIC  
CONDUCTIVITY DETECTORS) - AROMATIC AND HALOGENATED VOLATILES**

---

Allyl chloride	cis-1,2-Dichloroethene
Benzene	trans-1,2-Dichloroethene
Benzyl chloride	1,2-Dichloropropane
Bis(2-chloroisopropyl) ether	1,3-Dichloropropane
Bromoacetone	2,2-Dichloropropane
Bromobenzene	1,3-Dichloro-2-propanol
Bromochloromethane	1,1-Dichloropropene
Bromodichloromethane	cis-1,3-Dichloropropene
Bromoform	trans-1,3-Dichloropropene
Bromomethane	Epichlorhydrin
n-Butylbenzene	Ethylbenzene
sec-Butylbenzene	Hexachlorobutadiene
tert-Butylbenzene	Isopropylbenzene
Carbon tetrachloride	p-Isopropyltoluene
Chlorobenzene	Methylene chloride
Chlorodibromomethane	Naphthalene
Chloroethane	n-Propylbenzene
2-Chloroethanol	Styrene
2-Chloroethyl vinyl ether	1,1,1,2-Tetrachloroethane
Chloroform	1,1,2,2-Tetrachloroethane
Chloromethyl methyl ether	Tetrachloroethene
Chloroprene	Toluene
Chloromethane	1,2,3-Trichlorobenzene
2-Chlorotoluene	1,2,4-Trichlorobenzene
4-Chlorotoluene	1,1,1-Trichloroethane
1,2-Dibromo-3-chloropropane	1,1,2-Trichloroethane
1,2-Dibromoethane	Trichloroethene
Dibromomethane	Trichlorofluoromethane
1,2-Dichlorobenzene	1,2,3-Trichloropropane
1,3-Dichlorobenzene	1,2,4-Trimethylbenzene
1,4-Dichlorobenzene	1,3,5-Trimethylbenzene
Dichlorodifluoromethane	Vinyl chloride
1,1-Dichloroethane	o-Xylene
1,2-Dichloroethane	m-Xylene
1,1-Dichloroethene	p-Xylene

---

**TABLE 2-5**  
**METHODS 8031 AND 8032 (GC) AND 8033 (GC WITH  
NITROGEN-PHOSPHORUS DETECTION)**

---

Method 8031: Acrylonitrile  
 Method 8032: Acrylamide  
 Method 8033: Acetonitrile

---

TABLE 2-6  
METHOD 8041 (GC) - PHENOLS

---

2-Chloro-5-methylphenol	2,4-Dinitrophenol
4-Chloro-2-methylphenol	2,5-Dinitrophenol
4-Chloro-3-methylphenol	Dinoseb
2-Chlorophenol	2-Methyl-4,6-dinitrophenol
3-Chlorophenol	2-Methylphenol (o-Cresol)
4-Chlorophenol	3-Methylphenol (m-Cresol)
2-Cyclohexyl-4,6-dinitro-phenol	4-Methylphenol (p-Cresol)
2,3-Dichlorophenol	2-Nitrophenol
2,4-Dichlorophenol	3-Nitrophenol
2,5-Dichlorophenol	4-Nitrophenol
2,6-Dichlorophenol	Pentachlorophenol
3,4-Dichlorophenol	Phenol
3,5-Dichlorophenol	2,3,4,5-Tetrachlorophenol
2,3-Dimethylphenol	2,3,4,6-Tetrachlorophenol
2,4-Dimethylphenol	2,3,5,6-Tetrachlorophenol
2,5-Dimethylphenol	2,3,4-Trichlorophenol
2,6-Dimethylphenol	2,3,5-Trichlorophenol
3,4-Dimethylphenol	2,3,6-Trichlorophenol
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol

---

TABLE 2-7  
METHOD 8061 (GC/ECD) - PHTHALATE ESTERS

---

Bis(2-n-butoxyethyl) phthalate	Dicyclohexyl phthalate
Bis(2-ethoxyethyl) phthalate	Dihexyl phthalate
Bis(2-ethylhexyl) phthalate	Diisobutyl phthalate
Bis(2-methoxyethyl) phthalate	Di-n-butyl phthalate
Bis(4-methyl-2-pentyl)-phthalate	Diethyl phthalate
Butyl benzyl phthalate	Dinonyl phthalate
Diamyl phthalate	Dimethyl phthalate
	Di-n-octyl phthalate
	Hexyl 2-ethylhexyl phthalate

---

TABLE 2-8  
METHOD 8070 (GC) - NITROSAMINES

---

N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosodi-n-propylamine

---

TABLE 2-9  
METHOD 8081 (GC) - ORGANOCHLORINE PESTICIDES AND PCBs

---

Alachlor	Dichlone	Hexachlorobenzene
Aldrin	Dicofol	Hexachlorocyclo-
$\alpha$ -BHC	Dieldrin	pentadiene
$\beta$ -BHC	Endosulfan I	Isodrin
$\delta$ -BHC	Endosulfan II	Methoxychlor
$\gamma$ -BHC (Lindane)	Endosulfan sulfate	Mirex
Captafol	Endrin	Nitrofen
Chlorobenzilate	Endrin aldehyde	<i>trans</i> -Nonachlor
$\alpha$ -Chlordane	Endrin ketone	PCNB
$\gamma$ -Chlordane	Etridiazole	Permethrin ( <i>cis</i> and <i>trans</i> )
Chlordane (NOS)	Halowax-1000	Perthane
Chloroneb	Halowax-1001	Propachlor
Chloropropylate	Halowax-1013	Strobane
Chlorothalonil	Halowax-1014	Toxaphene
DBCP	Halowax-1051	Trifluralin
DCPA	Halowax-1099	
4,4'-DDD	Heptachlor	
4,4'-DDE	Heptachlor	
4,4'-DDT	epoxide	
Diallate		

---

TABLE 2-10  
METHOD 8082 (GC) - POLYCHLORINATED BIPHENYLS

---

Aroclor 1016	2,2',3,4,5'-Pentachlorobiphenyl
Aroclor 1221	2,2',4,5,5'-Pentachlorobiphenyl
Aroclor 1232	2,3,3',4',6-Pentachlorobiphenyl
Aroclor 1242	2,2',3,4,4',5'-Hexachlorobiphenyl
Aroclor 1248	2,2',3,4,5,5'-Hexachlorobiphenyl
Aroclor 1254	2,2',3,5,5',6-Hexachlorobiphenyl
Aroclor 1260	2,2',4,4',5,5'-Hexachlorobiphenyl
2-Chlorobiphenyl	2,2',3,3',4,4',5-Heptachlorobiphenyl
2,3-Dichlorobiphenyl	2,2',3,4,4',5,5'-Heptachlorobiphenyl
2,2',5-Trichlorobiphenyl	2,2',3,4,4',5',6-Heptachloro-
2,4',5-Trichlorobiphenyl	biphenyl
2,2',3,5'-Tetrachlorobiphenyl	2,2',3,4',5,5',6-Heptachlorobiphenyl
2,2',5,5'-Tetrachlorobiphenyl	2,2',3,3',4,4',5,5',6-Nonachloro-
2,3',4,4'-Tetrachlorobiphenyl	biphenyl

---

TABLE 2-11  
METHOD 8091 (GC) - NITROAROMATICS AND CYCLIC KETONES

---

Benefin	2,4-Dinitrotoluene
Butralin	2,6-Dinitrotoluene
1-Chloro-2,4-dinitrobenzene	Isopropalin
1-Chloro-3,4-dinitrobenzene	1,2-Naphthoquinone
1-Chloro-2-nitrobenzene	1,4-Naphthoquinone
1-Chloro-4-nitrobenzene	Nitrobenzene
2-Chloro-6-nitrotoluene	2-Nitrotoluene
4-Chloro-2-nitrotoluene	3-Nitrotoluene
4-Chloro-3-nitrotoluene	4-Nitrotoluene
2,3-Dichloronitrobenzene	Penoxalin [Pendimethalin]
2,4-Dichloronitrobenzene	Pentachloronitrobenzene
3,5-Dichloronitrobenzene	Profluralin
3,4-Dichloronitrobenzene	2,3,4,5-Tetrachloronitrobenzene
2,5-Dichloronitrobenzene	2,3,5,6-Tetrachloronitrobenzene
Dinitramine	1,2,3-Trichloro-4-nitrobenzene
1,2-Dinitrobenzene	1,2,4-Trichloro-5-nitrobenzene
1,3-Dinitrobenzene	2,4,6-Trichloronitrobenzene
1,4-Dinitrobenzene	Trifluralin

---

**TABLE 2-12**  
**METHOD 8100 - POLYNUCLEAR AROMATIC HYDROCARBONS**

---

Acenaphthene	Dibenzo(a,h)anthracene
Acenaphthylene	7H-Dibenzo(c,g)carbazole
Anthracene	Dibenzo(a,e)pyrene
Benz(a)anthracene	Dibenzo(a,h)pyrene
Benzo(b)fluoranthene	Dibenzo(a,i)pyrene
Benzo(j)fluoranthene	Fluoranthene
Benzo(k)fluoranthene	Fluorene
Benzo(g,h,i)perylene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	3-Methylcholanthrene
Chrysene	Naphthalene
Dibenzo(a,h)acridine	Phenanthrene
Dibenzo(a,j)acridine	Pyrene

---

**TABLE 2-13**  
**METHOD 8111 (GC) - HALOETHERS**

---

Bis(2-chloroethoxy)methane	2,3-Dichlorophenyl 4-nitrophenyl ether
Bis(2-chloroethyl) ether	3,4-Dichlorophenyl 4-nitrophenyl ether
Bis(2-chloroisopropyl) ether	4-Nitrophenyl phenyl ether
4-Bromophenyl phenyl ether	2,4,6-Trichlorophenyl 4-nitrophenyl ether
4-Chlorophenyl phenyl ether	2,3,6-Trichlorophenyl 4-nitrophenyl ether
2-Chlorophenyl 4-nitrophenyl ether	2,3,5-Trichlorophenyl 4-nitrophenyl ether
3-Chlorophenyl 4-nitrophenyl ether	2,4,5-Trichlorophenyl 4-nitrophenyl ether
4-Chlorophenyl 4-nitrophenyl ether	3,4,5-Trichlorophenyl 4-nitrophenyl ether
2,4-Dibromophenyl 4-nitrophenyl ether	2,3,4-Trichlorophenyl 4-nitrophenyl ether
2,4-Dichlorophenyl 3-methyl-4-nitrophenyl ether	
2,6-Dichlorophenyl 4-nitrophenyl ether	
3,5-Dichlorophenyl 4-nitrophenyl ether	
2,5-Dichlorophenyl 4-nitrophenyl ether	
2,4-Dichlorophenyl 4-nitrophenyl ether	

---

TABLE 2-14  
METHOD 8121 (GC) - CHLORINATED HYDROCARBONS

---

Benzal chloride	$\delta$ -Hexachlorocyclohexane
Benzotrichloride	[ $\delta$ -BHC]
Benzyl chloride	$\gamma$ -Hexachlorocyclohexane [ $\gamma$ -BHC]
2-Chloronaphthalene	Hexachlorocyclopentadiene
1,2-Dichlorobenzene	Hexachloroethane
1,3-Dichlorobenzene	Pentachlorobenzene
1,4-Dichlorobenzene	1,2,3,4-Tetrachlorobenzene
Hexachlorobenzene	1,2,3,5-Tetrachlorobenzene
Hexachlorobutadiene	1,2,4,5-Tetrachlorobenzene
$\alpha$ -Hexachlorocyclohexane [ $\alpha$ -BHC]	1,2,3-Trichlorobenzene
$\beta$ -Hexachlorocyclohexane [ $\beta$ -BHC]	1,2,4-Trichlorobenzene
	1,3,5-Trichlorobenzene

---

TABLE 2-15  
METHOD 8131 (GC) - ANILINE AND SELECTED DERIVATIVES

---

Aniline	2,6-Dibromo-4-nitroaniline
4-Bromoaniline	3,4-Dichloroaniline
2-Bromo-6-chloro-4-nitroaniline	2,6-Dichloro-4-nitroaniline
2-Bromo-4,6-dinitroaniline	2,4-Dinitroaniline
2-Chloroaniline	2-Nitroaniline
3-Chloroaniline	3-Nitroaniline
4-Chloroaniline	4-Nitroaniline
2-Chloro-4,6-dinitroaniline	2,4,6-Trichloroaniline
2-Chloro-4-nitroaniline	2,4,5-Trichloroaniline
4-Chloro-2-nitroaniline	

---

TABLE 2-16  
METHOD 8141 (GC) - ORGANOPHOSPHORUS COMPOUNDS

---

Aspon	Fenthion
Atrazine	Fonophos
Azinphos-ethyl	Hexamethyl phosphoramide (HMPA)
Azinphos-methyl	Leptophos
Bolstar (Sulprofos)	Malathion
Carbophenothion	Merphos
Chlorfenvinphos	Mevinphos
Chlorpyrifos	Monocrotophos
Chlorpyrifos methyl	Naled
Coumaphos	Parathion, ethyl
Crotoxyphos	Parathion, methyl
Demeton-O, and -S	Phorate
Diazinon	Phosmet
Dichlorofenthion	Phoshamidon
Dichlorvos (DDVP)	Ronnel
Dicrotophos	Simazine
Dimethoate	Stirophos (Tetrachlorvinphos)
Dioxathion	Sulfotep
Disulfoton	Tetraethyl pyrophosphate (TEPP)
EPN	Terbufos
Ethion	Thionazin (Zinophos)
Ethoprop	Tokuthion (Prothiophos)
Famphur	Trichlorfon
Fenitrothion	Trichloronate
Fensulfothion	Tri-o-cresyl phosphate (TOCP)

---

TABLE 2-17  
METHOD 8151 (GC USING METHYLATION OR PENTAFLUOROBENZYLATION  
DERIVATIZATION) - CHLORINATED HERBICIDES

---

Acifluorfen	Dicamba	MCPP
Bentazon	3,5-Dichlorobenzoic acid	4-Nitrophenol
Chloramben	Dichloroprop	Pentachlorophenol
2,4-D	Dinoseb	Picloram
Dalapon	5-Hydroxydicamba	2,4,5-TP (Silvex)
2,4-DB	MCPA	2,4,5-T
DCPA diacid		

---

TABLE 2-18  
METHOD 8260 (GC/MS)- VOLATILE ORGANIC COMPOUNDS

---

Acetone	Dibromomethane	Methylene chloride
Acetonitrile	1,2-Dichlorobenzene	Methyl acrylate
Acrolein (Propenal)	1,3-Dichlorobenzene	Methyl methacrylate
Acrylonitrile	1,4-Dichlorobenzene	4-Methyl-2-pentanone
Allyl alcohol	cis-1,4-Dichloro-	(MIBK)
Allyl chloride	2-butene	Naphthalene
Benzene	trans-1,4-Dichloro-2-	Nitrobenzene
Benzyl chloride	butene	2-Nitropropane
Bis(2-chloroethyl)-	Dichlorodifluoromethane	N-Nitroso-di-n-
sulfide	1,1-Dichloroethane	butylamine
Bromoacetone	1,2-Dichloroethane	Paraldehyde
Bromobenzene	1,1-Dichloroethene	Pentachloroethane
Bromochloromethane	cis-1,2-Dichloroethene	Pentafluorobenzene
Bromodichloromethane	trans-1,2-Dichloro-	2-Pentanone
Bromoform	ethene	2-Picoline
Bromomethane	1,2-Dichloropropane	1-Propanol
n-Butanol	1,3-Dichloropropane	2-Propanol
2-Butanone (MEK)	2,2-Dichloropropane	Propargyl alcohol
t-Butyl alcohol	1,3-Dichloro-2-propanol	β-Propiolactone
n-Butylbenzene	1,1-Dichloropropene	Propionitrile (Ethyl
sec-Butylbenzene	cis-1,3-Dichloropropene	cyanide)
tert-Butylbenzene	trans-1,3-Dichloro-	n-Propylamine
Carbon disulfide	propene	n-Propylbenzene
Carbon tetrachloride	1,2,3,4-Diepoxybutane	Pyridine
Chloral hydrate	Diethyl ether	Styrene
Chloroacetonitrile	1,4-Dioxane	1,1,1,2-Tetrachloro-
Chlorobenzene	Epichlorohydrin	ethane
1-Chlorobutane	Ethanol	1,1,2,2-Tetrachloro-
Chlorodibromomethane	Ethyl acetate	ethane
Chloroethane	Ethylbenzene	Tetrachloroethene
2-Chloroethanol	Ethylene oxide	Toluene
2-Chloroethyl vinyl	Ethyl methacrylate	o-Toluidine
ether	Hexachlorobutadiene	1,2,3-Trichlorobenzene
Chloroform	Hexachloroethane	1,2,4-Trichlorobenzene
1-Chlorohexane	2-Hexanone	1,1,1-Trichloroethane
Chloromethane	2-Hydroxypropionitrile	1,1,2-Trichloroethane
Chloroprene	Iodomethane	Trichloroethene
3-Chloropropionitrile	Isobutyl alcohol	Trichlorofluoromethane
2-Chlorotoluene	Isopropylbenzene	1,2,3-Trichloropropane
4-Chlorotoluene	p-Isopropyltoluene	1,2,4-Trimethylbenzene
Crotonaldehyde	Malononitrile	1,3,5-Trimethylbenzene
1,2-Dibromo-3-	Methacrylonitrile	Vinyl acetate
chloropropane	Methanol	Vinyl chloride
1,2-Dibromoethane	Methyl-t-butyl ether	o-Xylene
Dibromofluoromethane		m-Xylene
		p-Xylene

---

TABLE 2-19  
METHOD 8270 (GC/MS) - SEMIVOLATILE ORGANIC COMPOUNDS

---

Acenaphthene	Bromoxynil	1,3-Dichlorobenzene
Acenaphthylene	Butyl benzyl phthalate	1,4-Dichlorobenzene
Acetophenone	Captafol	3,3'-Dichlorobenzidine
2-Acetylaminofluorene	Captan	2,4-Dichlorophenol
1-Acetyl-2-thiourea	Carbaryl	2,6-Dichlorophenol
Aldrin	Carbofuran	Dichlorovos
2-Aminoanthraquinone	Carbophenothion	Dicrotophos
Aminoazobenzene	Chlordane (NOS)	Dieldrin
4-Aminobiphenyl	Chlorfenvinphos	Diethyl phthalate
3-Amino-9-ethyl- carbazole	4-Chloroaniline	Diethylstilbestrol
Anilazine	Chlorobenzilate	Diethyl sulfate
Aniline	5-Chloro-2-methyl-aniline	Dimethoate
o-Anisidine	4-Chloro-3-methylphenol	3,3'-Dimethoxybenzidine
Anthracene	3-(Chloromethyl)- pyridine hydro-chloride	Dimethylaminoazobenzene
Aramite	1-Chloronaphthalene	7,12-Dimethylbenz(a)-anthracene
Aroclor-1016	2-Chloronaphthalene	3,3'-Dimethylbenzidine
Aroclor-1221	2-Chlorophenol	$\alpha,\alpha$ -Dimethylphenethyl-amine
Aroclor-1232	4-Chloro-1,2-phenylene-diamine	2,4-Dimethylphenol
Aroclor-1242	4-Chloro-1,3-phenylene-diamine	Dimethyl phthalate
Aroclor-1248	4-Chlorophenyl phenyl ether	1,2-Dinitrobenzene
Aroclor-1254	Chrysene	1,3-Dinitrobenzene
Aroclor-1260	Coumaphos	1,4-Dinitrobenzene
Azinphos-methyl	p-Cresidine	4,6-Dinitro-2-methyl-phenol
Barban	Crotoxyphos	2,4-Dinitrophenol
Benz(a)anthracene	2-Cyclohexyl-4,6-dinitrophenol	2,4-Dinitrotoluene
Benzidine	4,4'-DDD	2,6-Dinitrotoluene
Benzo(b)fluoranthene	4,4'-DDE	Dinocap
Benzo(k)fluoranthene	4,4'-DDT	Dinoseb
Benzoic acid	Demeton-O	Diphenylamine
Benzo(g,h,i)perylene	Demeton-S	5,5-Diphenylhydantoin
Benzo(a)pyrene	Diallate (cis or trans)	1,2-Diphenylhydrazine
p-Benzoquinone	2,4-Diaminotoluene	Di-n-octyl phthalate
Benzyl alcohol	Dibenz(a,j)acridine	Disulfoton
$\alpha$ -BHC	Dibenz(a,h)anthracene	Endosulfan I
$\beta$ -BHC	Dibenzofuran	Endosulfan II
$\delta$ -BHC	Dibenzo(a,e)pyrene	Endosulfan sulfate
$\gamma$ -BHC (Lindane)	1,2-Dibromo-3-chloropropane	Endrin
Bis(2-chloroethoxy)- methane	Di-n-butyl phthalate	Endrin aldehyde
Bis(2-chloroethyl) ether	Dichlone	Endrin ketone
Bis(2-chloroisopropyl) ether	1,2-Dichlorobenzene	EPN
Bis(2-ethylhexyl) phthalate		Ethion
4-Bromophenyl phenyl ether		Ethyl carbamate

TABLE 2-19 (CONTINUED)

---

Fenthion	Naphthalene	Phosphamidion
Fluchloralin	1,4-Naphthoquinone	Phthalic anhydride
Fluoranthene	1-Naphthylamine	2-Picoline (2-Methylpyridine)
Fluorene	2-Naphthylamine	Piperonyl sulfoxide
Heptachlor	Nicotine	Pronamide
Heptachlor epoxide	5-Nitroacenaphthene	Propylthiouracil
Hexachlorobenzene	2-Nitroaniline	Pyrene
Hexachlorobutadiene	3-Nitroaniline	Resorcinol
Hexachlorocyclo-	4-Nitroaniline	Safrole
pentadiene	5-Nitro-o-anisidine	Strychnine
Hexachloroethane	Nitrobenzene	Sulfallate
Hexachlorophene	4-Nitrobiphenyl	Terbufos
Hexachloropropene	Nitrofen	1,2,4,5-Tetrachloro-
Hexamethylphosphoramide	2-Nitrophenol	benzene
Hydroquinone	4-Nitrophenol	2,3,4,6-Tetrachloro-
Indeno(1,2,3-cd)pyrene	Nitroquinoline-1-oxide	phenol
Isodrin	N-Nitrosodi-n-	Tetrachlorvinphos
Isophorone	butylamine	Tetraethyl dithio-
Isosafrole	N-Nitrosodiethylamine	pyrophosphate
Kepone	N-Nitrosodimethylamine	Tetraethyl
Leptophos	N-Nitrosodiphenylamine	pyrophosphate
Malathion	N-Nitrosodi-n-propyl-	Thionazine
Maleic anhydride	amine	Thiophenol
Mestranol	N-Nitrosomethylethyl-	(Benzene thiol)
Methapyrilene	amine	Toluene diisocyanate
Methoxychlor	N-Nitrosomorpholine	o-Toluidine
3-Methylcholanthrene	N-Nitrosopiperidine	Toxaphene
4,4'-Methylenebis-	N-Nitrosopyrrolidine	1,2,4-Trichlorobenzene
(2-chloroaniline)	5-Nitro-o-toluidine	2,4,5-Trichlorophenol
4,4'-Methylenebis-	Octamethyl pyrophos-	2,4,6-Trichlorophenol
(N,N-dimethylaniline)	phoramido	O,O,O-Triethyl
Methyl methanesulfonate	4,4'-Oxydianiline	phosphorothioate
2-Methylnaphthalene	Parathion	Trifluralin
Methyl parathion	Pentachlorobenzene	2,4,5-Trimethylaniline
2-Methylphenol	Pentachloronitrobenzene	Trimethyl phosphate
3-Methylphenol	Pentachlorophenol	1,3,5-Trinitrobenzene
4-Methylphenol	Phenacetin	Tris(2,3-dibromopropyl)
Mevinphos	Phenanthrene	phosphate
Mexacarbate	Phenobarbital	Tri-p-tolyl phosphate
Mirex	Phenol	
Monocrotophos	1,4-Phenylenediamine	
Naled	Phorate	
	Phosalone	
	Phosmet	

---

TABLE 2-20  
METHOD 8275 (TE/GC/MS) - SEMIVOLATILE ORGANIC COMPOUNDS

---

Acenaphthene	Pyrene	2,3',4,4',5-Penta-
Acenaphthylene	1,2,4-Trichlorobenzene	chlorobiphenyl
Anthracene	2-Chlorobiphenyl	2,2',3,4,4',5'-
Benz(a)anthracene	3,3'-Dichlorobiphenyl	Hexachlorobiphenyl
Benzo(a)pyrene	2,2',5-Trichloro-	2,2',3,3',4,4'-
Benzo(b)fluoranthene	biphenyl	Hexachlorobiphenyl
Benzo(g,h,i)perylene	2,3',5-Trichloro-	2,2',3,4',5,5',6-
Benzo(k)fluoranthene	biphenyl	Heptachlorobiphenyl
4-Bromophenyl phenyl ether	2,4',5-Trichloro-	2,2',3,4,4',5,5'-
1-Chloronaphthalene	biphenyl	Heptachlorobiphenyl
Chrysene	2,2',5,5'-Tetrachloro-	2,2',3,3',4,4',5-
Dibenzofuran	biphenyl	Heptachlorobiphenyl
Dibenz(a,h)anthracene	2,2'4,5'-Tetrachloro-	2,2',3,3',4,4',5,5'-
Dibenzothiophene	biphenyl	Octachlorobiphenyl
Fluoranthene	2,2'3,5'-Tetrachloro-	2,2',3,3'4,4',5,5',6-
Fluorene	biphenyl	Nonachlorobiphenyl
Hexachlorobenzene	2,3',4,4'-Tetrachloro-	2,2',3,3'4,4',5,5',6,6'-
Indeno(1,2,3-cd)pyrene	biphenyl	Decachlorobiphenyl
Naphthalene	2,2',4,5,5'-Penta-	
Phenanthrene	chlorobiphenyl	

---

TABLE 2-21  
METHODS 8280 (HRGC/LRMS) AND 8290 (HRGC/HRMS) -  
POLYCHLORINATED DIBENZO-*p*-DIOXINS (PCDDs)  
AND POLYCHLORINATED DIBENZOFURANS (PCDFs)

---

2,3,7,8-TCDD	HxCDD, total	1,2,3,7,8,9-HxCDF
TCDD, total	OCDD	2,3,4,6,7,8-HxCDF
1,2,3,7,8-PeCDD	2,3,7,8-TCDF	HxCDF, total
PeCDD, total	TCDF, total	1,2,3,4,6,7,8-HpCDF
1,2,3,4,7,8-HxCDD	1,2,3,7,8-PeCDF	1,2,3,4,7,8,9-HpCDF
1,2,3,6,7,8-HxCDD	2,3,4,7,8-PeCDF	HpCDF, total
1,2,3,7,8,9-HxCDD	PeCDF, total	OCDF
HxCDD, total	1,2,3,4,7,8-HxCDF	
1,2,3,4,6,7,8-HpCDD	1,2,3,6,7,8-HxCDF	

---

TABLE 2-22  
METHOD 8310 (HPLC) - POLYNUCLEAR AROMATIC HYDROCARBONS

---

Acenaphthene	Chrysene
Acenaphthylene	Dibenzo(a,h)anthracene
Anthracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(g,h,i)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene

---

TABLE 2-23  
METHOD 8315 - CARBONYL COMPOUNDS

---

Acetaldehyde	Hexanal (Hexaldehyde)
Acetone	Isovaleraldehyde
Acrolein	Nonanal
Benzaldehyde	Octanal
Butanal (Butyraldehyde)	Pentanal (Valeraldehyde)
Crotonaldehyde	Propanal
Cyclohexanone	(Propionaldehyde)
Decanal	m-Tolualdehyde
2,5-Dimethylbenzaldehyde	o-Tolualdehyde
Formaldehyde	p-Tolualdehyde
Heptanal	

---

TABLE 2-24  
METHOD 8316 (HPLC)

---

Acrylamide  
Acrylonitrile  
Acrolein

---

TABLE 2-25  
METHOD 8318 (HPLC) - N-METHYLCARBAMATES

---

Aldicarb (Temik)  
Aldicarb sulfone  
Carbaryl (Sevin)  
Carbofuran (Furadan)  
Dioxacarb  
3-Hydroxycarbofuran  
Methiocarb (Mesurol)  
Methomyl (Lannate)  
Promecarb  
Propoxur (Baygon)

---

TABLE 2-26. METHOD 8321 (HPLC/TS/MS) - NONVOLATILE ORGANIC COMPOUNDS

---

<u>Azo Dyes</u>	<u>Anthraquinone Dyes</u>
Disperse Red 1	Disperse Blue 3
Disperse Red 5	Disperse Blue 14
Disperse Red 13	Disperse Red 60
Disperse Yellow 5	Coumarin Dyes
Disperse Orange 3	
Disperse Orange 30	
Disperse Brown 1	<u>Fluorescent Brighteners</u>
Solvent Red 3	Fluorescent Brightener 61
Solvent Red 23	Fluorescent Brightener 236
<u>Chlorinated Phenoxyacid Compounds</u>	
2,4-D	<u>Carbamates</u>
2,4-D, butoxyethanol ester	Aldicarb
2,4-D, ethylhexyl ester	Aldicarb sulfone
2,4-DB	Aldicarb sulfoxide
Dalapon	Aminocarb
Dicamba	Barban
Dichlorprop	Benomyl
Dinoseb	Bromacil
MCPA	Bendiocarb
MCPP	Carbaryl
Silvex (2,4,5-TP)	Carbendazim
2,4,5-T	Carbofuran
2,4,5-T, butyl ester	3-Hydroxycarbofuran
2,4,5-T, butoxyethanol ester	Chloroxuron
<u>Alkaloids</u>	Chloropropham
Strychnine	Diuron
Caffeine	Fenuron
<u>Organophosphorus Compounds</u>	Fluometuron
Asulam	Linuron
Fensulfothion	Methiocarb
Dichlorvos	Methomyl
Dimethoate	Mexacarbate
Disulfoton	Monuron
Parathion methyl	Neburon
Merphos	Oxamyl
Methomyl	Propachlor
Monocrotophos	Propham
Famphur	Propoxur
Naled	Siduron
Phorate	Tebuthiuron
Trichlorfon	
Thiofanox	
Tris(2,3-dibromopropyl) phosphate (Tris-BP)	

---

TABLE 2-27  
METHOD 8325 (HPLC/PB/MS) - NONVOLATILE ORGANIC COMPOUNDS

---

Benzidine	3,3'-Dimethylbenzidine
Benzoylprop ethyl	Diuron
Carbaryl	Linuron (Lorox)
o-Chlorophenyl thiourea	Monuron
3,3'-Dichlorobenzidine	Rotenone
3,3'-Dimethoxybenzidine	Siduron

---

TABLE 2-28  
METHOD 8330 (HPLC) - NITROAROMATICS AND NITRAMINES

---

4-Amino-2,6-dinitrotoluene (4-Am-DNT)	Nitrobenzene (NB)
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	2-Nitrotoluene (2-NT)
1,3-Dinitrobenzene (1,3-DNB)	3-Nitrotoluene (3-NT)
2,4-Dinitrotoluene (2,4-DNT)	4-Nitrotoluene (4-NT)
2,6-Dinitrotoluene (2,6-DNT)	Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine (HMX)
Hexahydro-1,3,5-trinitro- 1,3,5-triazine (RDX)	1,3,5-Trinitrobenzene (1,3,5-TNB)
Methyl-2,4,6-trinitrophenyl- nitramine (Tetryl)	2,4,6-Trinitrotoluene (2,4,6-TNT)

---

TABLE 2-29  
METHOD 8331 (REVERSE PHASE HPLC)

---

Tetrazene

---

TABLE 2-30  
METHOD 8332 (HPLC)

---

Nitroglycerine

---

TABLE 2-31  
METHOD 8410 - SEMIVOLATILE ORGANIC COMPOUNDS

---

Acenaphthene	2,6-Dinitrotoluene
Acenaphthylene	Di-n-octyl phthalate
Anthracene	Di-n-propyl phthalate
Benzo(a)anthracene	Fluoranthene
Benzo(a)pyrene	Fluorene
Benzoic acid	Hexachlorobenzene
Bis(2-chloroethoxy)methane	1,3-Hexachlorobutadiene
Bis(2-chloroethyl) ether	Hexachlorocyclopentadiene
Bis(2-chloroisopropyl) ether	Hexachloroethane
Bis(2-ethylhexyl) phthalate	Isophorone
4-Bromophenyl phenyl ether	2-Methylnaphthalene
Butyl benzyl phthalate	2-Methylphenol
4-Chloroaniline	4-Methylphenol
4-Chloro-3-methylphenol	Naphthalene
2-Chloronaphthalene	2-Nitroaniline
2-Chlorophenol	3-Nitroaniline
4-Chlorophenol	4-Nitroaniline
4-Chlorophenyl phenyl ether	Nitrobenzene
Chrysene	2-Nitrophenol
Dibenzofuran	4-Nitrophenol
Di-n-butyl phthalate	N-Nitrosodimethylamine
1,2-Dichlorobenzene	N-Nitrosodiphenylamine
1,3-Dichlorobenzene	N-Nitroso-di-n-propylamine
1,4-Dichlorobenzene	Pentachlorophenol
2,4-Dichlorophenol	Phenanthrene
Diethyl phthalate	Phenol
Dimethyl phthalate	Pyrene
4,6-Dinitro-2-methylphenol	1,2,4-Trichlorobenzene
2,4-Dinitrophenol	2,4,5-Trichlorophenol
2,4-Dinitrotoluene	2,4,6-Trichlorophenol

---

TABLE 2-32  
METHOD 8430 (GC/FT-IR) - BIS(2-CHLOROETHYL) ETHER  
AND ITS HYDROLYSIS PRODUCTS

---

Bis(2-chloroethyl) ether
2-Chloroethanol
2-(2-Chloroethoxy)ethanol
Diethylene glycol
Ethylene glycol

---

TABLE 2-33. DETERMINATIVE METHODS FOR INORGANIC ANALYTES

Analyte	Applicable Method(s)
Aluminum . . . . .	6010, 6020, 6800, 7000, 7010
Antimony . . . . .	6010, 6020, 6200, 6800, 7000, 7062
Arsenic . . . . .	6010, 6020, 6200, 7010, 7061, 7062, 7063
Barium . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Beryllium . . . . .	6010, 6020, 7000, 7010
Boron . . . . .	6800
Bromide . . . . .	6500, 9056, 9211
Cadmium . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Calcium . . . . .	6010, 6020, 6200, 6800, 7000
Chloride . . . . .	6500, 9056, 9057, 9212, 9250, 9251, 9253
Chromium . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Chromium, hexavalent . . . . .	7195, 7196, 7197, 7198, 7199
Cobalt . . . . .	6010, 6020, 6200, 7000, 7010
Copper . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Cyanide . . . . .	9010, 9012, 9013, 9213
Fluoride . . . . .	6500, 9056, 9214
Iron . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Lead . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Lithium . . . . .	6010, 7000
Magnesium . . . . .	6010, 6020, 6800, 7000
Manganese . . . . .	6010, 6020, 6200, 7000, 7010
Mercury . . . . .	4500, 6020, 6200, 6800, 7470, 7471, 7472, 7473, 7474
Molybdenum . . . . .	6010, 6200, 6800, 7000, 7010
Nickel . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Nitrate . . . . .	6500, 9056, 9210
Nitrite . . . . .	6500, 9056, 9216
Osmium . . . . .	7000
Phosphate . . . . .	6500, 9056
Phosphorus . . . . .	6010
Phosphorus, white . . . . .	7580
Potassium . . . . .	6010, 6020, 6200, 6800, 7000
Rubidium . . . . .	6200
Selenium . . . . .	6010, 6020, 6200, 6800, 7010, 7741, 7742
Silver . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Sodium . . . . .	6010, 6020, 7000
Strontium . . . . .	6010, 6200, 6800, 7000
Sulfate . . . . .	6500, 9035, 9036, 9038, 9056
Sulfide . . . . .	9030, 9031, 9215
Thallium . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Thorium . . . . .	6200
Tin . . . . .	6200, 7000
Titanium . . . . .	6200
Vanadium . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Zinc . . . . .	6010, 6020, 6200, 6800, 7000, 7010
Zirconium . . . . .	6200

TABLE 2-34  
CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES  
FOR AQUEOUS MATRICES<sup>A</sup>

Name	Container <sup>1</sup>	Preservation	Maximum holding time
<b>Inorganic Tests:</b>			
Chloride	P, G	None required	28 days
Cyanide, total and amenable to chlorination	P, G	Cool to 4°C; if oxidizing agents present add 5 mL 0.1N NaAsO <sub>2</sub> per L or 0.06 g of ascorbic acid per L; adjust pH>12 with 50% NaOH. See Method 9010 for other interferences.	14 days
Hydrogen ion (pH)	P, G	None required	24 hours
Nitrate	P, G	Cool to 4°C	48 hours
Sulfate	P, G	Cool to 4°C	28 days
Sulfide	P, G	Cool to 4°C, add zinc acetate	7 days
<b>Metals:</b>			
Chromium VI	P, G	Cool to 4°C	24 hours
Mercury	P, G	HNO <sub>3</sub> to pH<2	28 days
Metals, except chromium VI and mercury	P, G	HNO <sub>3</sub> to pH<2	6 months
<b>Organic Tests:</b>			
Acrolein and acrylonitrile	G, PTFE-lined septum	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup> , Adjust pH to 4-5	14 days
Benzidines	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	7 days until extraction, 40 days after extraction
Chlorinated hydrocarbons	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	7 days until extraction, 40 days after extraction
Dioxins and Furans	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	30 days until extraction, 45 days after extraction
Haloethers	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	7 days until extraction, 40 days after extraction
Nitroaromatics and cyclic ketones	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup> , store in dark	7 days until extraction, 40 days after extraction
Nitrosamines	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup> , store in dark	7 days until extraction, 40 days after extraction

(continued on next page)

TABLE 2-34 (continued)

Name	Container <sup>1</sup>	Preservation	Maximum holding time
Oil and grease	G	Cool to 4°C, add 5 mL diluted HCl	28 days
Organic carbon, total (TOC)	P, G	Cool to 4°C, store in dark <sup>2</sup>	28 days
Organochlorine pesticides	G, PTFE-lined cap	Cool to 4°C	7 days until extraction, 40 days after extraction
Organophosphorus pesticides	G, PTFE-lined cap	Cool to 4°C <sup>4</sup>	7 days until extraction, 40 days after extraction
PCBs	G, PTFE-lined cap	Cool to 4°C	7 days until extraction, 40 days after extraction
Phenols	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	7 days until extraction, 40 days after extraction
Phthalate esters	G, PTFE-lined cap	Cool to 4°C	7 days until extraction, 40 days after extraction
Polynuclear aromatic hydrocarbons	G, PTFE-lined cap	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup> , store in dark	7 days until extraction, 40 days after extraction
Purgeable aromatic hydrocarbons	G, PTFE-lined septum	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>2,3</sup>	14 days
Purgeable Halocarbons	G, PTFE-lined septum	Cool to 4°C, 0.008% Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> <sup>3</sup>	14 days
Total organic halides (TOX)	G, PTFE-lined cap	Cool to 4°C, Adjust to pH<2 with H <sub>2</sub> SO <sub>4</sub>	28 days
Radiological Tests: Alpha, beta and radium	P, G	HNO <sub>3</sub> to pH<2	6 months

<sup>A</sup> Table originally excerpted, in part, from Table II, 49 FR 28, October 26, 1984, and revised as appropriate for SW-846. See Chapter Three, Chapter Four, or the individual methods for more information.

<sup>1</sup> Polyethylene (P) or Glass (G)

<sup>2</sup> Adjust to pH<2 with H<sub>2</sub>SO<sub>4</sub>, HCl or solid NaHSO<sub>4</sub>. Free chlorine must be removed prior to adjustment.

<sup>3</sup> Free chlorine must be removed by the appropriate addition of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>.

<sup>4</sup> Adjust samples to pH 5-8 using NaOH or H<sub>2</sub>SO<sub>4</sub>.

**TABLE 2-35**  
**PREPARATION METHODS FOR ORGANIC ANALYTES**  
 (Note: Footnote text is located on the last page of the table.)

Analyte Type	Matrix			
	Aqueous <sup>1</sup>	Solids	Sludges and Emulsions <sup>1,2</sup>	Organic Liquids, Tars, Oils
Acid Extractable	3510 3520 (pH ≤ 2) 3541 3545 3550	3540 3541 3545 3550	3520 (pH ≤ 2)	3650 3580 <sup>3</sup>
Acrolein, Acrylonitrile, and Acetonitrile	5031	5031	5031	3585
Acrylamide	8032 <sup>4</sup>			
Aniline and Selected Derivatives	3510 3520 (pH >11) 5031 <sup>11</sup>	3540 3541 3545 3550	3520 (pH >11)	3580 <sup>3</sup>
Aromatic Volatiles	5021 5030 5032	5021 5032 5035	5030 5032	3585
Base/Neutral Extractable	3510 3520 (pH >11)	3540 3541 3545 3550	3520 (pH >11)	3650 3580 <sup>3</sup>
Carbamates	8318 <sup>5</sup> 8321	8318 <sup>5</sup> 8321	8318 <sup>5</sup>	8318 <sup>5</sup>
Chlorinated Herbicides	8151 <sup>6</sup> (pH ≤ 2) 8321	8151 <sup>6</sup> 8321	8151 <sup>6</sup> (pH ≤ 2)	3580 <sup>3</sup>
Chlorinated Hydrocarbons	3510 3520 (pH as received)	3540 3541 3550	3520 (pH as received)	3580 <sup>3</sup>
Dyes	3510 3520	3540 3541 3545 3550		
Explosives	8330 <sup>7</sup> 8331 <sup>8</sup>	8330 <sup>7</sup> 8331 <sup>8</sup>		
Formaldehyde	8315 <sup>9</sup>	8315 <sup>9</sup>		
Haloethers	3510 3520	3540 3541 3545 3550		

TABLE 2-35  
PREPARATION METHODS FOR ORGANIC ANALYTES  
(continued)

Analyte Type	Matrix			
	Aqueous <sup>1</sup>	Solids	Sludges and Emulsions <sup>1,2</sup>	Organic Liquids, Tars, Oils
Halogenated Volatiles	5021 5030 5032	5021 5032 5035	5030	3585
Nitroaromatic and Cyclic Ketones	3510 3520 (pH 5-9)	3540 3541 3545 3550	3520 (pH 5-9)	3580 <sup>3</sup>
Nitrosamines	3510 3520	3540 3541 3545 3550		
Non-halogenated Volatiles	5021 5031 5032	5021 5031 5032	5021 5031 5032	5032 3585
Organochlorine Pesticides	3510 3520 3535 (pH 5-9)	3540 3541 3545 3550	3520 (pH 5-9)	3580 <sup>3</sup>
Organophosphorus Pesticides	3510 3520 (pH 5-8)	3540 3541 3545	3520 (pH 5-8)	3580 <sup>3</sup>
Phenols	3510 3520 (pH ≤ 2)	3540 3541 3545 3550 3562	3520 (pH ≤ 2)	3650 3580 <sup>3</sup>
Phthalate Esters	3510 3520 3535 (pH 5-7)	3540 3541 3545 3550	3520 (pH 5- 7)	3580 <sup>3</sup>
Polychlorinated Biphenyls	3510 3520 3535 (pH 5-9)	3540 3541 3545 3562	3520 (pH 5-9)	3580 <sup>3</sup>
PCDDs and PCDFs	8280 <sup>10</sup> 8290 <sup>10</sup>	8280 <sup>10</sup> 8290 <sup>10</sup>	8280 <sup>10</sup> 8290 <sup>10</sup>	8280 <sup>10</sup> 8290 <sup>10</sup>

TABLE 2-35  
PREPARATION METHODS FOR ORGANIC ANALYTES  
(continued)

Analyte Type	Matrix			
	Aqueous <sup>1</sup>	Solids	Sludges and Emulsions <sup>1,2</sup>	Organic Liquids, Tars, Oils
Polynuclear Aromatic Hydrocarbons	3510 3520 (pH as received) 3541 3545 3550 3561	3540	3520 (pH as received)	3580 <sup>3</sup>
Volatile Organics	5021 5030 5031 5032	5021 5031 5032 5035	5021 5030 5031 5032	3585

Footnotes for Table 2-35

- <sup>1</sup> The pH at which extraction should be performed is shown in parentheses.
- <sup>2</sup> If attempts to break an emulsion are unsuccessful, these methods may be used.
- <sup>3</sup> Method 3580 is only appropriate if the sample is soluble in the specified solvent.
- <sup>4</sup> Method 8032 contains the extraction, cleanup, and determinative procedures for this analyte.
- <sup>5</sup> Method 8318 contains the extraction, cleanup, and determinative procedures for these analytes.
- <sup>6</sup> Method 8151 contains the extraction, cleanup, and determinative procedures for these analytes.
- <sup>7</sup> Method 8330 contains the extraction, cleanup, and determinative procedures for these analytes.
- <sup>8</sup> Method 8331 is for Tetrazene only, and contains the extraction, cleanup, and determinative procedures for this analyte.
- <sup>9</sup> Method 8315 contains the extraction, cleanup, and determinative procedures for this analyte.
- <sup>10</sup> Methods 8280 and 8290 contain the extraction, cleanup, and determinative procedures for these analytes.
- <sup>11</sup> Method 5031 may be used when only aniline is to be determined.

TABLE 2-36. CLEANUP METHODS FOR ORGANIC ANALYTE EXTRACTS

Analyte Type	Method
Acid Extractable	3650, 3640
Base/Neutral Extractable	3650, 3640
Carbamates	8318 <sup>1</sup>
Chlorinated Herbicides	8151 <sup>2</sup>
Chlorinated Hydrocarbons	3620 3640
Haloethers	3620 3640
Nitroaromatics & Cyclic Ketones	3620 3640
Nitrosamines	3610, 3620, 3640
Organochlorine Pesticides	3620 3630 3640 3660
Organophosphorus Pesticides	3620
Phenols	3630 3640 3650 8041 <sup>3</sup>
Phthalate Esters	3610 3611 3620 3640
Polychlorinated Biphenyls	3620 3630 3640 3660 3665
Polychlorinated Dibenzo- <i>p</i> -Dioxins and Polychlorinated Dibenzofurans	8280 <sup>4</sup> 8290 <sup>4</sup>
Polynuclear Aromatic Hydrocarbons	3610 3611 3630 3640 3650

<sup>1</sup> Method 8318 contains the extraction, cleanup, and determinative procedures for these analytes.

<sup>2</sup> Method 8151 contains the extraction, cleanup, and determinative procedures for these analytes.

<sup>3</sup> Method 8041 includes a derivatization technique followed by GC/ECD analysis, if interferences are encountered using GC/FID.

<sup>4</sup> Methods 8280 and 8290 contain the extraction, cleanup, and determinative procedures for these analytes.

TABLE 2-37. DETERMINATIVE METHODS ORGANIC ANALYTES

Analyte Type	GC/MS Method	Specific GC Method	HPLC Method
Acid Extractable	8270		
Acrolein, Acrylonitrile, Acetonitrile	8260	8031 8033 <sup>1</sup>	8315 <sup>2</sup> 8316
Acrylamide	8260	8032	8316
Aniline and Selected Derivatives	8270	8131	
Aromatic Volatiles	8260	8021	
Base/Neutral Extractable	8270		8325 <sup>4</sup>
Carbamates			8318, 8321
Chlorinated Herbicides	8270 <sup>3</sup>	8151	8321
Chlorinated Hydrocarbons	8270	8121	
Dyes			8321
Explosives			8330, 8331, 8332
Formaldehyde			8315
Haloethers	8270	8111	
Halogenated Volatiles	8260	8011, 8021	
Nitroaromatics and Cyclic Ketones	8270	8091	8330 <sup>5</sup>
Nitrosoamines	8270	8070	
Non-halogenated Volatiles	8260	8015	8315
Organochlorine Pesticides	8270 <sup>3</sup>	8081	
Organophosphorus Pesticides	8270 <sup>3</sup>	8141	8321
Phenols	8270	8041	
Petroleum Hydrocarbons		8015	
Phthalate Esters	8270	8061	
Polychlorinated Biphenyls	8270 <sup>3</sup>	8082	
PCDDs and PCDFs	8280 8290		
Polynuclear Aromatic Hydrocarbons	8270	8100	8310
Volatile Organics	8260	8011, 8015, 8021, 8031, 8032, 8033	8315 8316

<sup>1</sup> Of these analytes, Method 8033 is for acetonitrile only.<sup>2</sup> Of these analytes, Method 8315 is for acrolein only.<sup>3</sup> This method is an alternative confirmation method, not the method of choice.<sup>4</sup> Benzidines and related compounds.<sup>5</sup> Nitroaromatics (see "Explosives").

TABLE 2-38  
PREPARATION METHODS FOR INORGANIC ANALYSES<sup>1</sup>

MATRIX	METHOD
Surface Water	3005, 3010, 3015, 3020
Ground Water	3005, 3010, 3015, 3020
Extracts	3010, 3015, 3020
Aqueous samples containing suspended solids	3010, 3015, 3020
Oils	3031, 3040, 3051, 3052 <sup>2</sup>
Oil Sludges	3031, 3052 <sup>2</sup>
Tars	3031, 3052 <sup>2</sup>
Waxes	3031, 3040, 3052 <sup>2</sup>
Paints	3031, 3052 <sup>2</sup>
Paint Sludges	3031, 3052 <sup>2</sup>
Petroleum Products	3031, 3040, 3052 <sup>2</sup>
Sediments	3050, 3051, 3052 <sup>2</sup> , 3060 <sup>3</sup>
Sludges	3050, 3051, 3052 <sup>2</sup> , 3060 <sup>3</sup>
Soil Samples	3050, 3051, 3052 <sup>2</sup> , 3060 <sup>3</sup>
Ashes	3052 <sup>2</sup>
Biological Tissues	3052 <sup>2</sup>

<sup>1</sup>It is the responsibility of the analyst to refer to each analytical method to determine applicability of the chosen method to a specific waste type and target analyte.

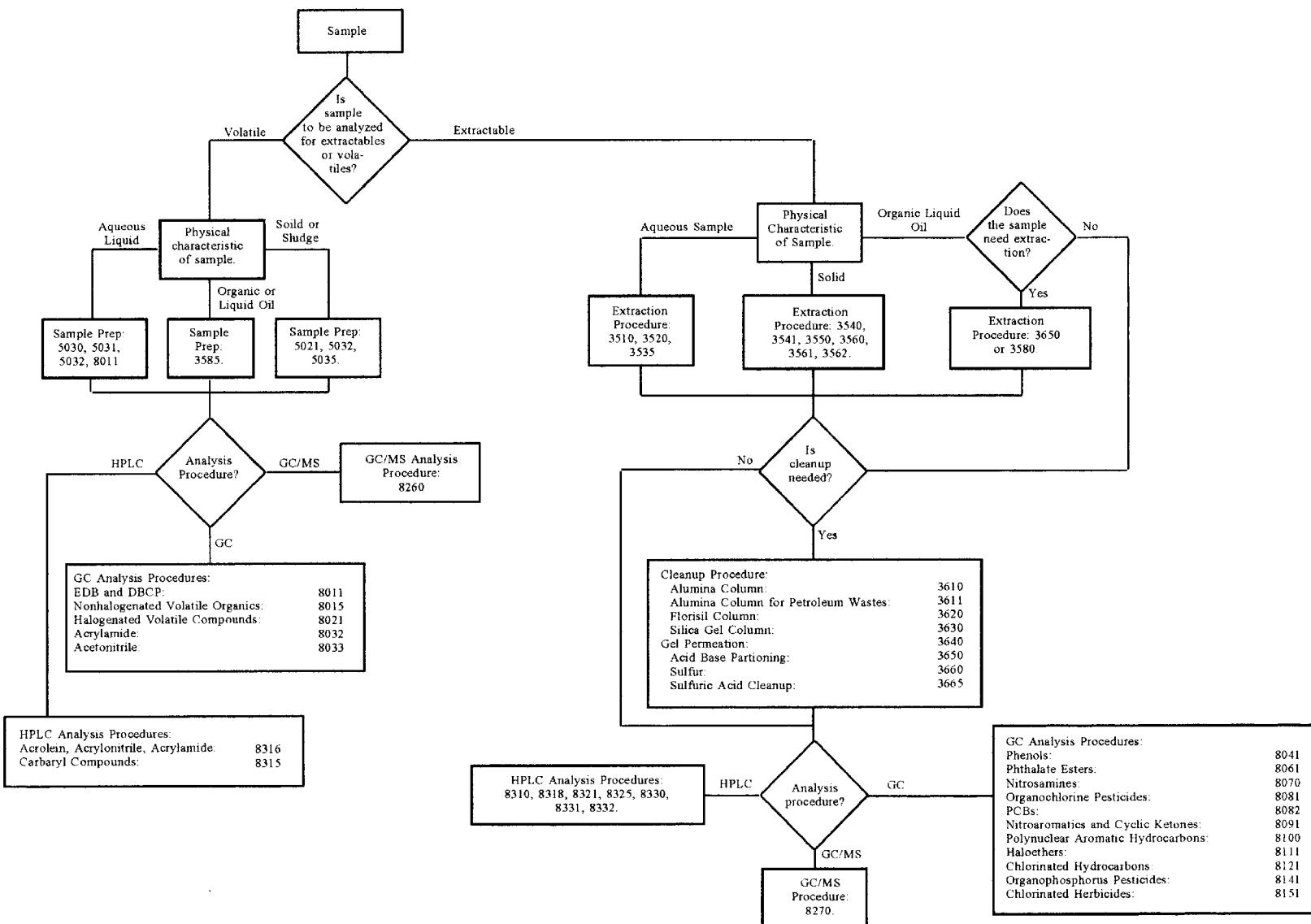
<sup>2</sup>For total decomposition analysis ONLY.

<sup>3</sup> For the analysis of samples for hexavalent chromium ONLY.

TABLE 2-39  
 USE OF LEACHING, EXTRACTION AND DIGESTION METHODS  
 FOR INORGANIC ANALYSIS  
 (Generally ordered by increasing strength)

METHOD	REAGENTS & CONDITIONS	USE
1310	dilute acetic acid (synthetic municipal solid waste leachate)	Simulate leaching of a waste in a municipal solid waste landfill
1311	dilute acetic acid (synthetic municipal solid waste leachate)	Simulate leaching of a waste in a municipal solid waste landfill
1312	dilute $H_2SO_4$ and $HNO_3$ (synthetic acid rain)	Simulate acid rain leaching of a waste
1320	dilute $H_2SO_4$ and $HNO_3$ (synthetic acid rain)	Simulate long-term acid rain leaching of a waste
3040	solvent	Dissolution of oils, oily wastes, greases and waxes
3005	$HNO_3$ , heat	Surface and ground waters
3020	$HNO_3$ , heat	Aqueous samples and extracts for GFAA work only
3010	$HNO_3$ , $HCl$ , heat	Aqueous samples and extracts
3060A	$Na_2CO_3/NaOH$ , heat	Soils, sludges, sediments and some industrial wastes for the analysis of hexavalent chromium only.
3015	$HNO_3$ , $HCl$ (optional), pressure, heat	Aqueous samples and extracts
3050	$HNO_3$ , $H_2O_2$ , $HCl$ (optional), heat	Sediments, soils, and sludges
3051	$HNO_3$ , $HCl$ (optional), pressure, heat	Sludges, sediments, soils and oils
3031	Potassium permanganate, $H_2SO_4$ , $HNO_3$ , $HCl$ , heat	Oils, oily sludges, tars, waxes, paint, paint sludge
3052	$HNO_3$ , HF, $HCl$ (optional) $H_2O_2$ (optional), heat, pressure	Siliceous, organic and other complex matrices for total sample decomposition

**FIGURE 2-1**  
**ORGANIC ANALYSIS OPTIONS FOR SOLID AND LIQUID MATRICES**



**FIGURE 2-2**  
**SCHEMATIC OF SEQUENCE TO DETERMINE**  
**IF A WASTE IS HAZARDOUS BY CHARACTERISTIC**

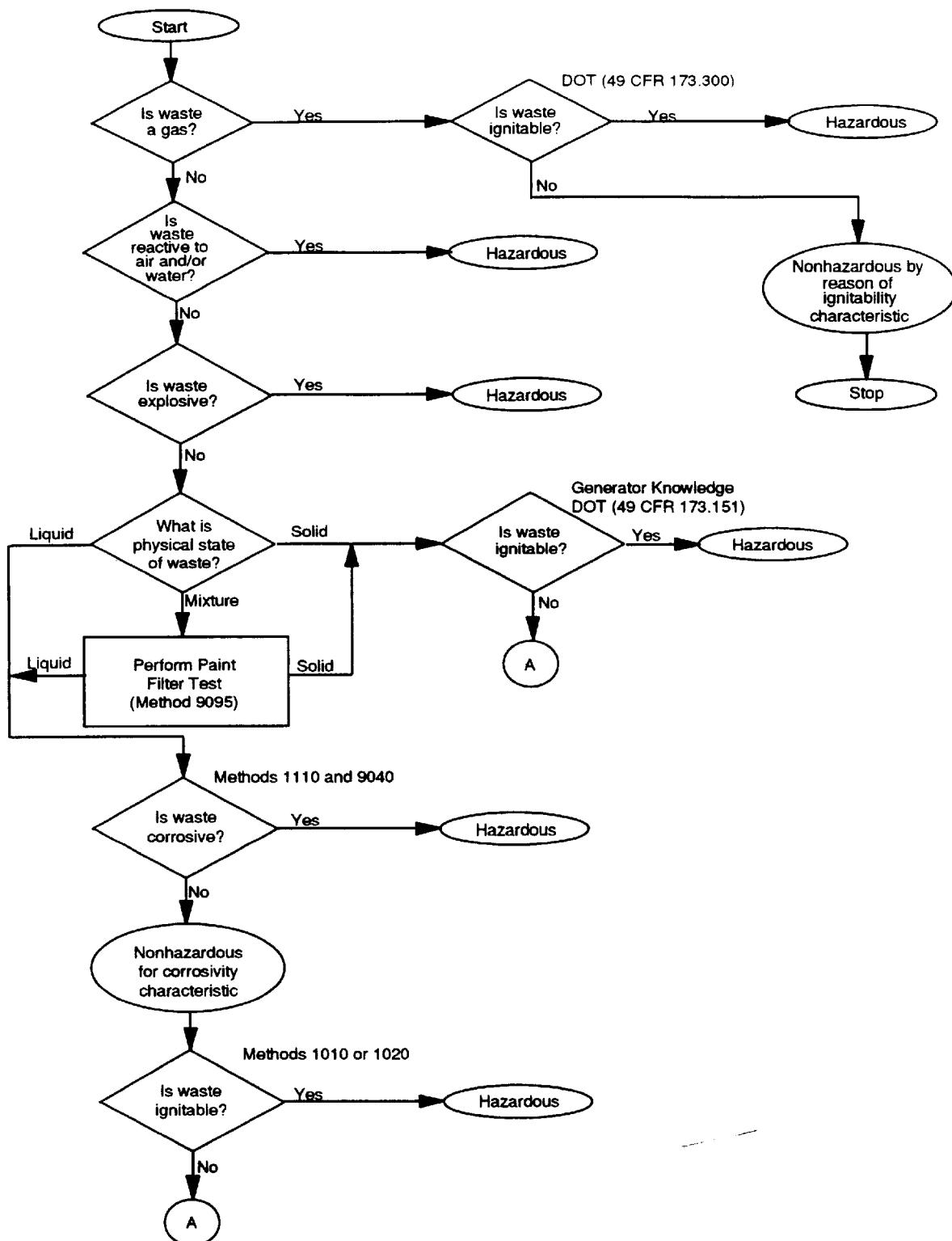


FIGURE 2-2  
(Continued)

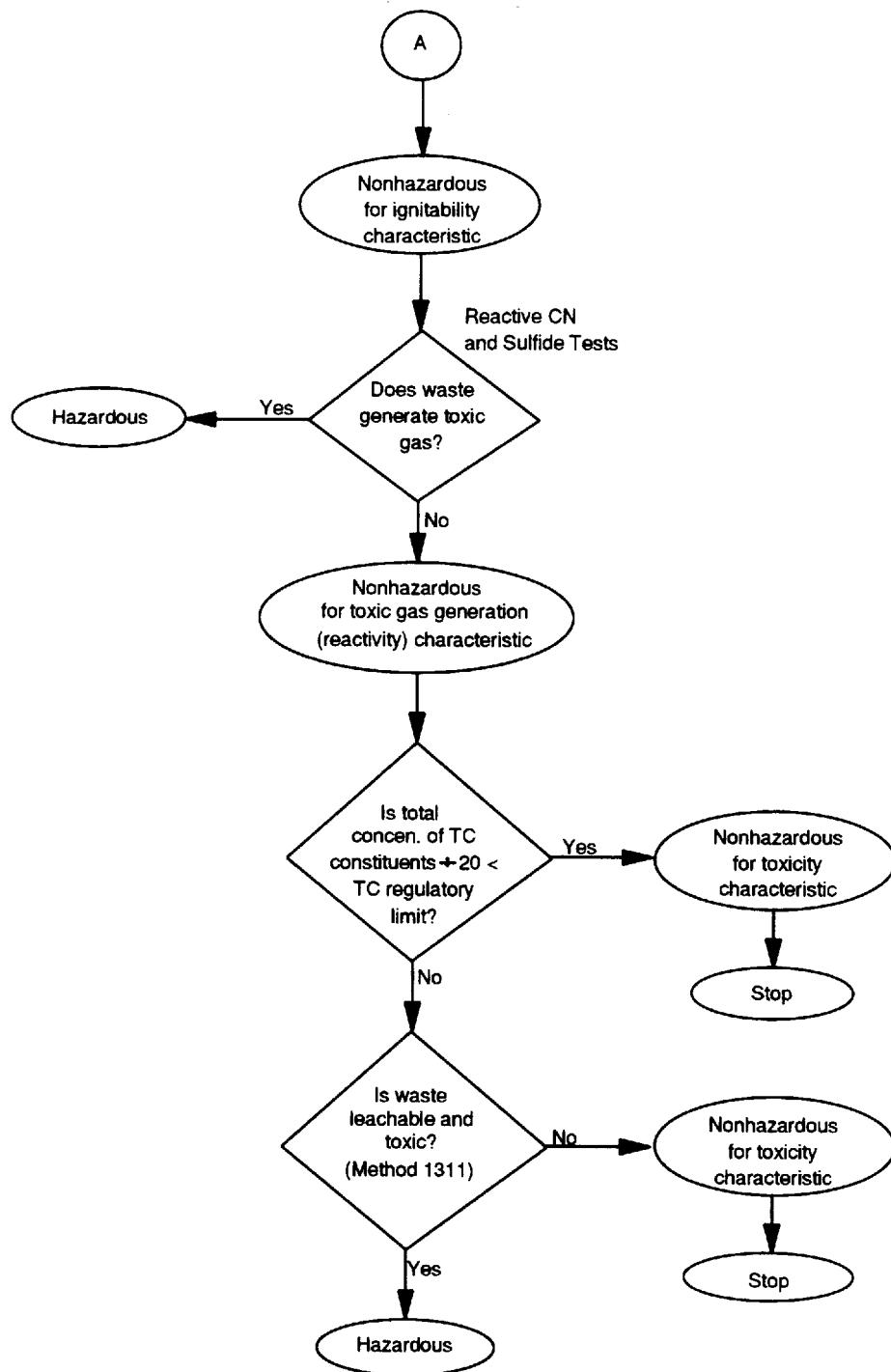


FIGURE 2-3A  
RECOMMENDED SW-846 METHODS FOR ANALYSIS OF EP LEACHATES

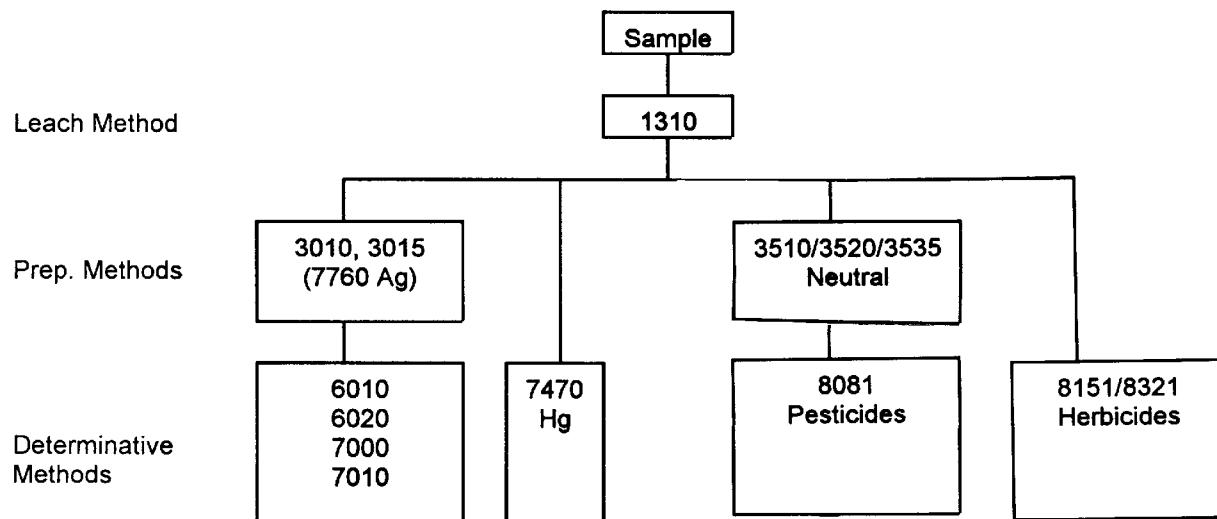


FIGURE 2-3B  
RECOMMENDED SW-846 METHODS FOR ANALYSIS OF TCLP LEACHATES

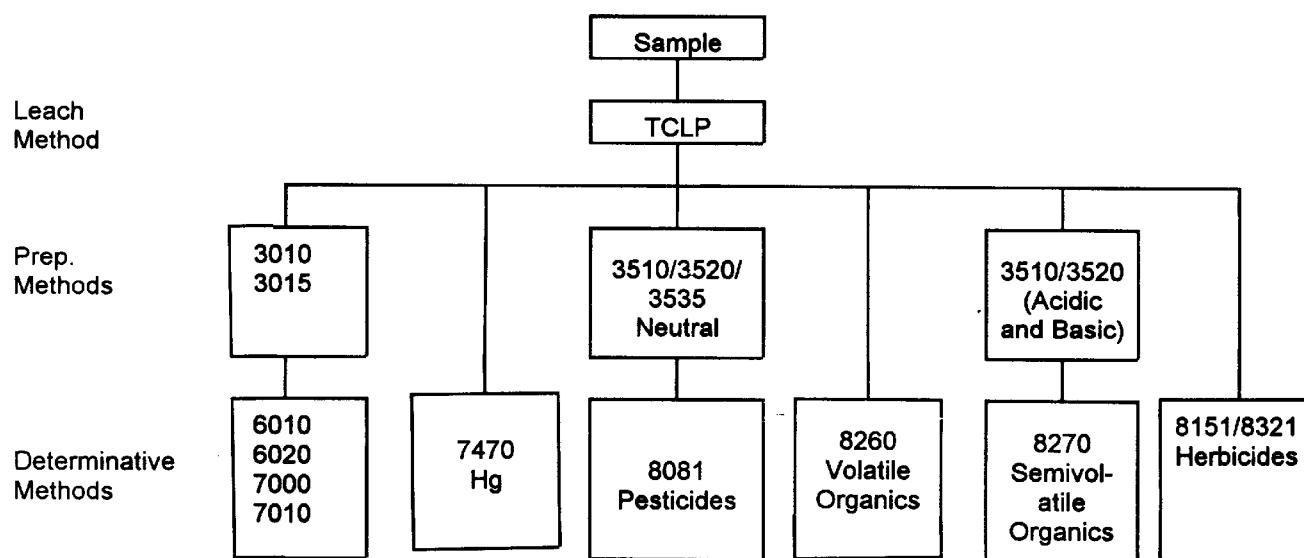
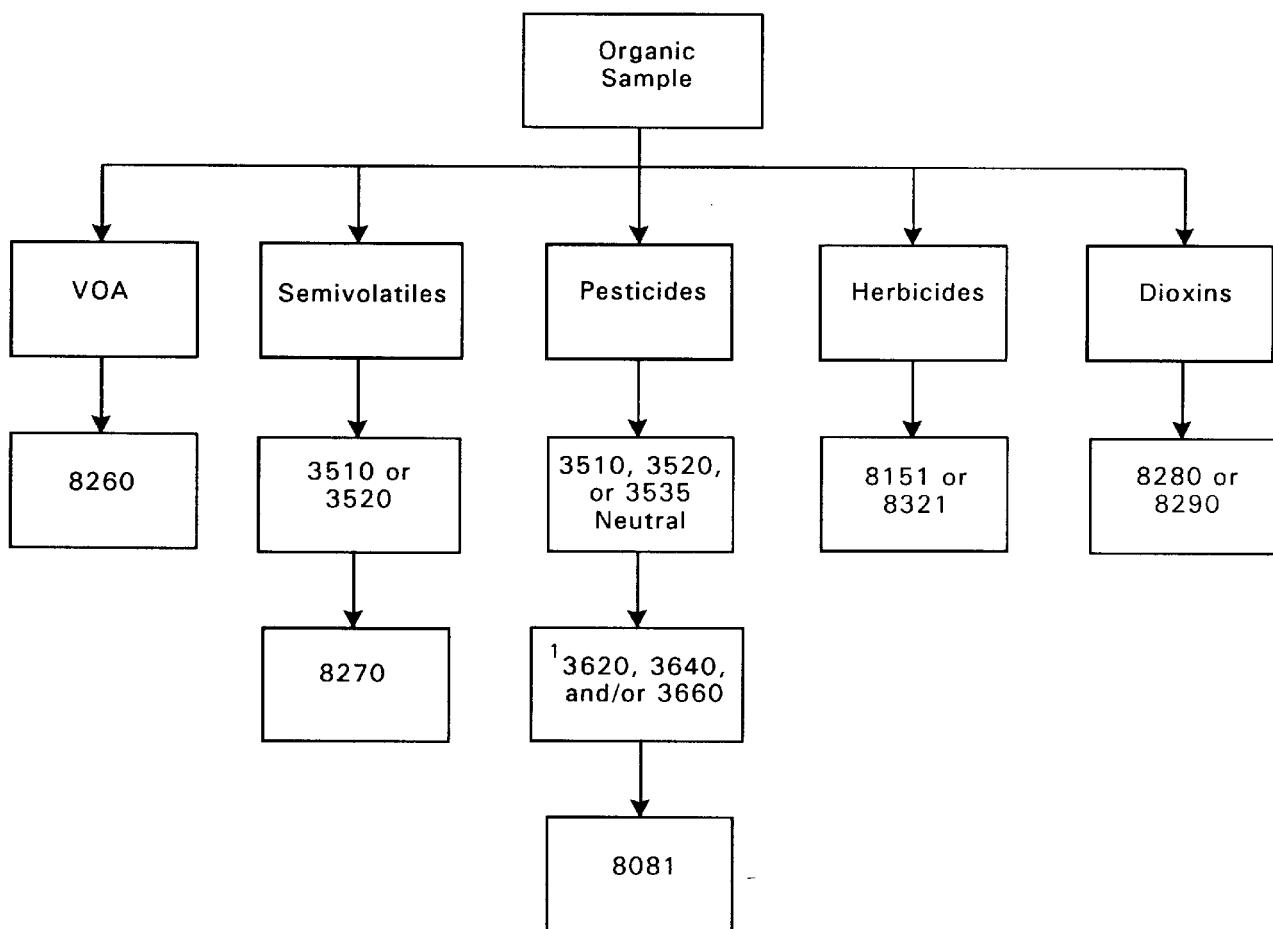
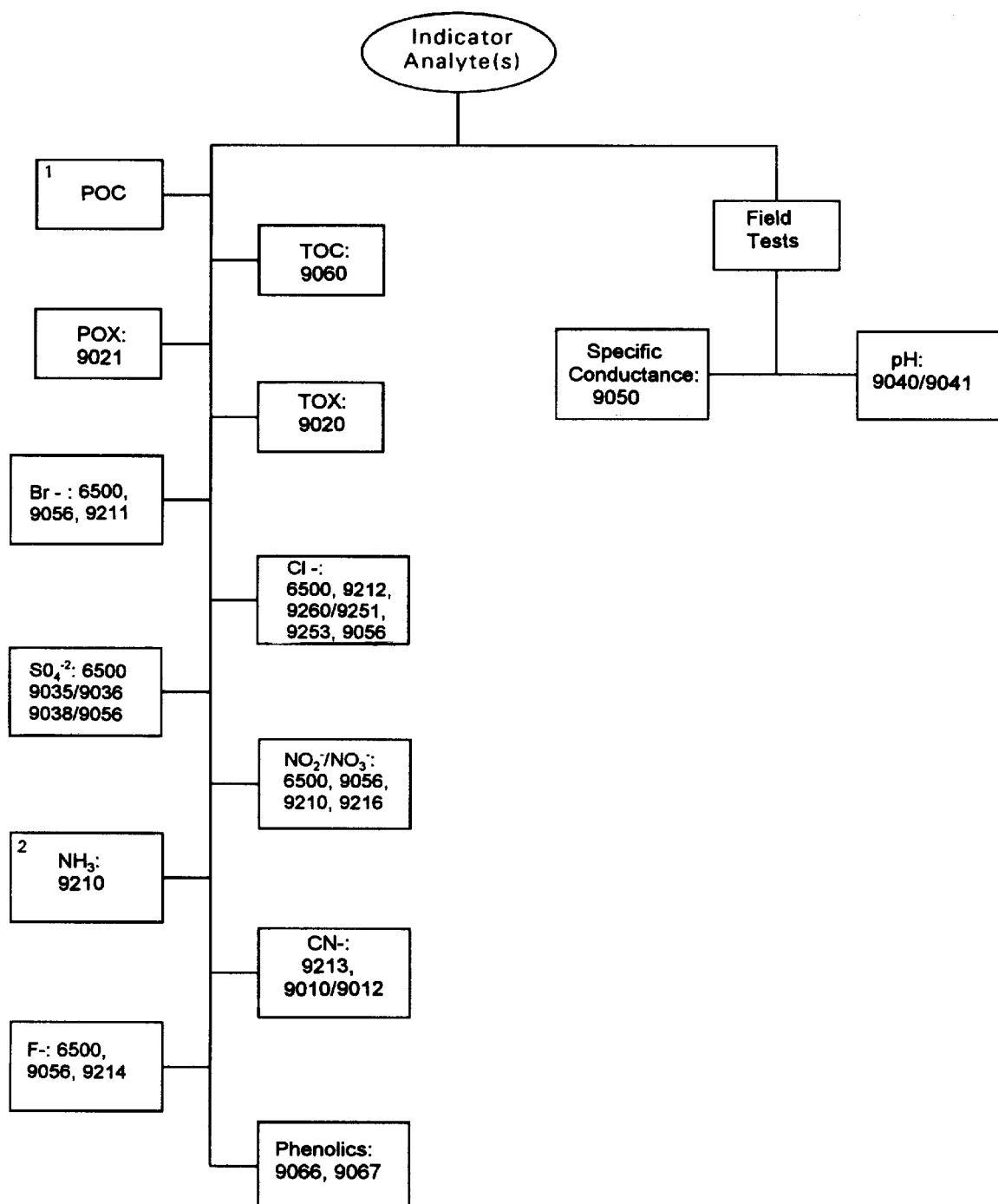


FIGURE 2-4A.  
GROUND WATER ANALYSIS: ORGANIC ANALYTES



1 - Optional: Cleanup required only if interferences prevent analysis.

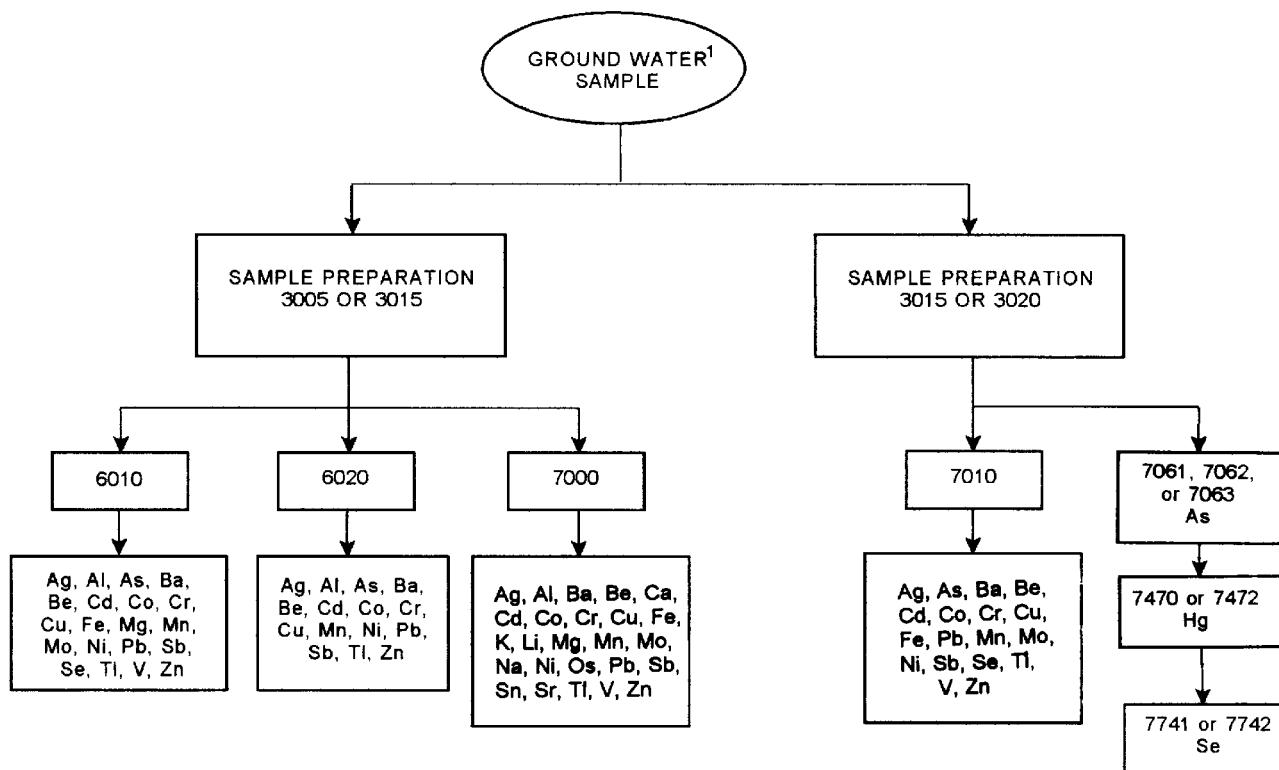
FIGURE 2-4B.  
GROUND WATER ANALYSIS: INDICATOR ANALYTES



1 - Barcelona, 1984, (See Reference 1)

2 - Riggin, 1984, (See Reference 2)

FIGURE 2-4C.  
GROUND WATER ANALYSIS: INORGANIC ANALYTES



<sup>1</sup> When analyzing for total dissolved metals, digestion is not necessary if the samples are filtered at the time of collection, and then acidified to the same concentration as the standards.